SOUTHERN POWER AND INDUSTRY

SEPTEMBER, 1955

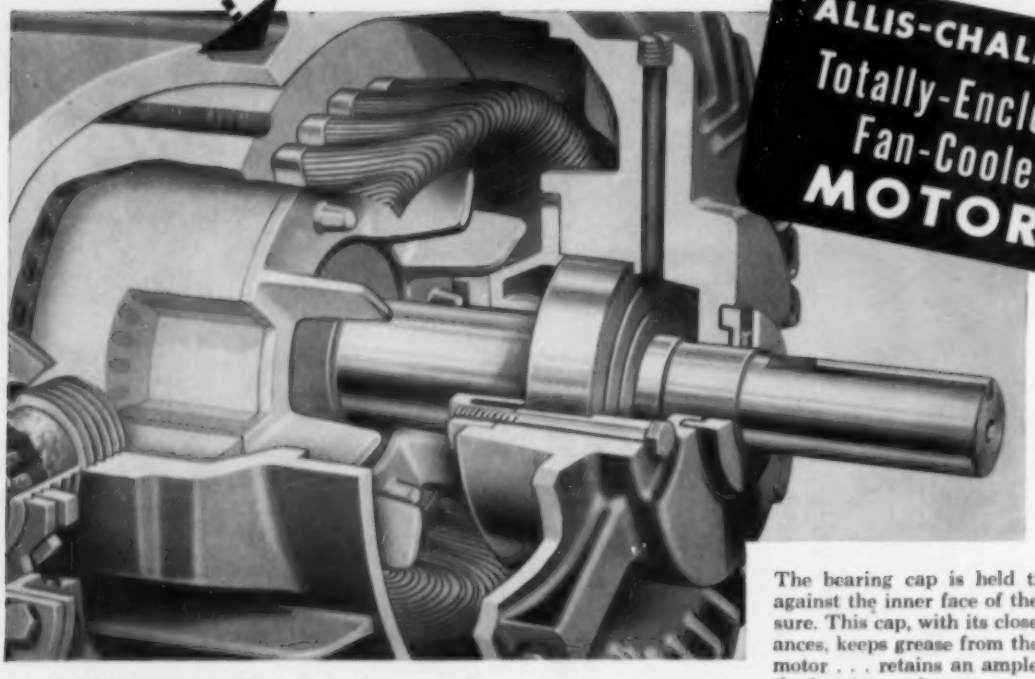
USE OF SEA WATER
IN INDUSTRY

A. D. Rust, Dow Chemical Company, Freeport, Texas, discusses intake and distribution problems—structures, chlorination, screens, pumping and pipe lining problems.

STARTS PAGE 70

Complete Contents on Page 3

Get Both
bearing features



fully enclosed and protected

The bearing cap is held tightly in place against the inner face of the bearing enclosure. This cap, with its close running clearances, keeps grease from the interior of the motor . . . retains an ample supply within the bearing enclosure.

At the outer side of the bearing, double labyrinth seals keep grease in, also keep dirt out. What's more, large grease reservoirs act as additional dirt traps.

. . . yet easy to grease

You can lubricate the bearings without dismantling the motor. Pipe-tapped holes in the bearing housings at three points provide both means for inserting new grease and a means of flushing out old grease.

Look for the extra bolts on the end housing . . . the sign of greater value. Ask your Allis-Chalmers representative or Authorized Distributor to show you a cutaway section of this maintenance-cutting design. Or write Allis-Chalmers, Milwaukee 1, Wisconsin, for Bulletin 51B7225.

A-4509

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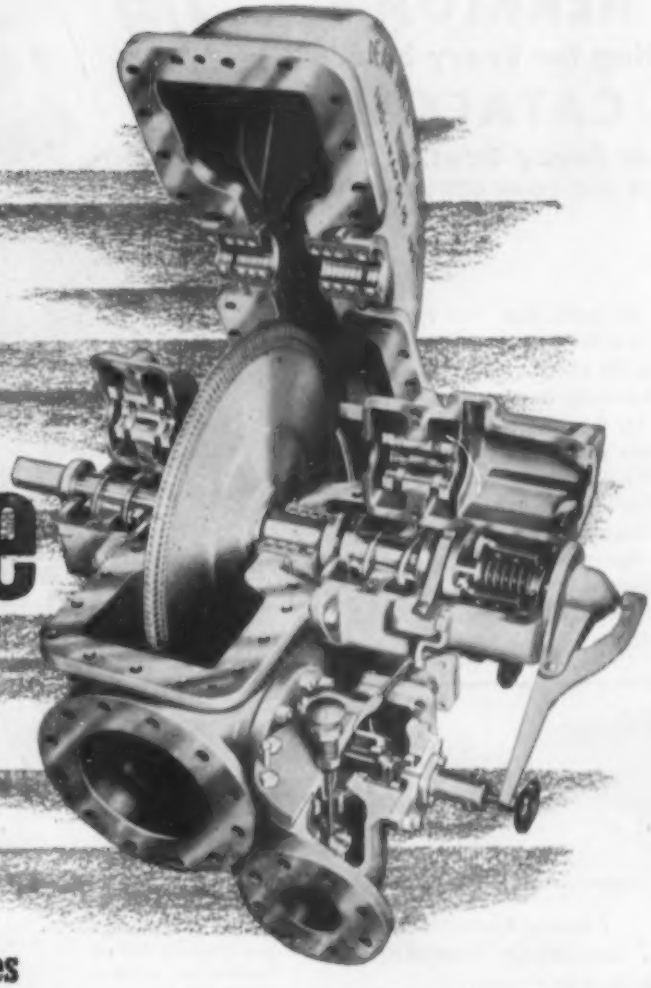
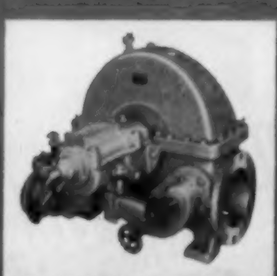
Volume 73 Number 9





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STEEL
for the 1001 applications where safety and strength come first. Kerrigan Steel Grating is BONDERIZED for corrosion resistance and extra years of life.

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spark-proof for those whose need is strength AND lightness. Extra safe and strong. Allowable fiber stress 15,000 psi. Modulus of elasticity 10,000,000 psi.

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non-magnetic steel for the chemical, oil and packing industries . . . for ANY installation where high resistance to heat, acids, chemicals, and corrosion is needed.

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SOUTHERN POWER AND INDUSTRY

Vol. 73
No. 9

SEPTEMBER, 1955

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Feature Articles in This Issue

Design, Operation and Maintenance

Helping the Man-in-the-Plant

Regular Features—Departments

Contents indexed regularly by Engineering Index, Inc.

Editorial and Executive Offices: SOUTHERN POWER & INDUSTRY, 806 PEACHTREE ST., N. E. ATLANTA 5, GEORGIA

Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

September, 1955

► HIGH VOLTAGE POWER DISTRIBUTION SYSTEM at The National Plastic Products Company's Odenton, Maryland, plant is flexible and modern. Power is used 24 hours a day, seven days a week. Originally low tension service was purchased at 240 volts 3 phase and 120/240 volts single phase. Expansion indicated that it would be impractical to continue to spread the use of this low voltage, so power was then purchased at 13,200 volts.

Power requirements, distribution data, and advantages of the modern system are described in this issue by David Goldstein, Electrical Engineer, with the Maryland company. The choice of 480 volts resulted in lower installation costs and added greatly to the flexibility which is required by the constantly shifting of load requirements in this plant.

► TURBO MOBILE POWER PLANT, designed by Clark Bros Co., is a complete self-contained 5500 kw power plant rated at 80 F ambient temperature up to an altitude of 1000 ft. The prime mover is a simple, open cycle, dual shaft, series flow gas turbine direct driving a two pole synchronous generator.

Complete plant, with auxiliaries, controls, fuel storage and handling, auxiliary engine driven generator, station switchgear, etc., is mounted on one rail car. Connections to the fuel supply and transmission lines are the only external connections required.

The gas turbine power plant is designed specifically as a mobile source of a large amount of electrical power which can be used if an emergency should occur. Even though an emergency unit, the power plant is of heavy duty design and can be operated continuously no matter what the duration of the emergency may be. It does not require water and may be moved and placed in operation in hours.

► LARGER AND LARGER--Westinghouse is now building a super-critical pressure steam turbine generator unit with a nominal rating of 325,000 kw . . . B & W is constructing a 2,400,000 lb/hr boiler which will consume over 50 carloads of coal a day. Design pressure is 2500 psi. Boiler will be equipped to burn either coal, oil or natural gas or a combination of these fuels.

► FIRST "CANNED MOTOR-PUMP" ever used to circulate boiler feedwater in a closed-loop system has been placed in operation at Virginia Electric Power Company's Possum Point generating station.

Pump (built by Westinghouse) is a hermetically-sealed unit that provides a means of circulating a liquid coolant or other fluids in high-temperature, high-pressure, closed-loop systems with zero leakage. Installation at the Possum Point station circulates 4700 gpm of 605 F water at 1725 psi continuously, taking suction from the steam drum and pumping back to the drum.

Advantages, in addition to the zero-leakage feature, include simplified installation, minimum instrumentation, and simplified maintenance (no external shaft seals).

(Continued on next page)

Facts and trends (continued from page 4)

► THOMAS BAND WELDER by Kraft Equipment Company, Savannah, Georgia, is a new tool for installing face wires and their retainer bands on cylindrical filter screens, washers and deckers. Tool welds face wire seam and also spot welds the two ends of the band together.

Big operating advantage of the light weight tool (over conventional silver brazing techniques) is saving in time. Welder does a job of joining the face wire and also the six to nine bands required for holding the average face wire in position in less than 60 seconds per band. Normal time required for this operation, using the silver brazing method, will average 2 to 3 hours.

Complete mechanism of the Band Welder is enclosed in a two piece non-conducting Fiberglas case--an important safety feature considering the wet conditions found in and around areas where cylindrical type filters and screens are used.

► BURNER DESIGN & OPERATION is one of the features of Texas Electric Service Company's Eagle Mountain Plant, described in this issue. Forney Engineering combination gas and wide range mechanical atomizing oil burners are equipped with remote controls for gas operation.

These controls permit lighting or shutting down each burner from the firing aisle platform or from the control room by a single control switch. Operation controls burner cocks and air registers through sequential programming control and provides complete protection by electronic devices and interlocks against failure of pilot light or main burner during the starting cycle.

First generating unit of the station was placed in operation during the fall of 1954; second unit is now under construction with ultimate expansion scheduled for 4 units. Completely outdoor installation features a B & W pressurized furnace rated at 1,050,000 lb/hr continuous.

► 25,000 KVA MOBILE TRANSFORMER is being used by the Louisville Gas and Electric Co. as a replacement in emergencies and for routine maintenance work. The forced-oil, forced air-cooled General Electric unit, has four windings for connection to circuits of 138,000 v, 37,000 v and 14,000 v. Any combination of the four voltage ratings may be used.

Transformer is mounted on a 16 wheel carryall trailer. Numerous large chemical plants in the Louisville area make it essential to deal swiftly with emergency outages, since a power failure could be costly as well as dangerous at these plants.

► SILICONE-PROTECTED MOTORS (instead of the conventional totally enclosed fan-cooled design) are being successfully operated on off-shore, oil-well platforms near the mouth of the Mississippi River. At one installation, a 300 hp, 900 rpm Electric Machinery "Sil-Clad" induction motor drives a two-stage reciprocating "gas lift" compressor.

Coil insulation made up of silicone rubbers, tapes and varnishes, is sealed against moisture penetration and is highly resistant to corrosion by salt air. Manufacturer emphasizes that lower first cost, easier maintenance and more resistance to internal corrosion are a few of the advantages.

Write the editors for additional information on any of the above items. SOUTHERN POWER & INDUSTRY. 806 Peachtree St., N.E. Atlanta 5, Ga.

this little drip costs you money!

On a 10¢-per-gallon product, 6 CC of leakage per minute costs you about $90 per year in unnecessary product waste.

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BJ mechanical seals

Eliminate unnecessary stuffingbox leakage by installing a BJ Mechanical Seal. You not only realize important savings of pumped products but you also save on repacking and downtime losses. A BJ Mechanical Seal also prevents contamination of the pumped liquid ... protects against volatile and corrosive liquid hazards.

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Copes-Vulcan helps to make MORE

THE ALL-OUTDOOR Louis V. Sutton Steam Electric Generating Plant of the Carolina Power & Light Company at Wilmington, N. C. Copes-Vulcan Combustion Control, Boiler Feed Water Control, and Automatic-Sequential Soot Blowing help to maintain maximum boiler efficiency.

REPEAT ORDER for Copes-Vulcan Boiler Control and Pump Recirculation

from Carolina Power and Light Company for the Cape Fear Steam Electric Station

Copes-Vulcan maintains perpetual interest in every installation *after* it is in service. And throughout the life of the equipment, trained Copes-Vulcan servicemen will regularly visit the plant to check performance and see that everything is functioning as it should. If you'd like this attention on your jobs, give Copes-Vulcan a crack at the control and cleaning of your next boiler.

POWER FOR CAROLINA

At Carolina Power & Light Company's new outdoor installation, the Louis V. Sutton Steam Electric Generating Plant, steam is generated in two coal-fired boilers designed for 1750 psi at 1005 F. Unit 1 is a Combustion Engineering steam generator with a design load capacity of 950,000 pph. Unit 2 is a radiant-reheat Babcock & Wilcox boiler designed for 900,000 pph, with a reheat to 1005 F. Copes-Vulcan control helps keep these steam generators efficient.

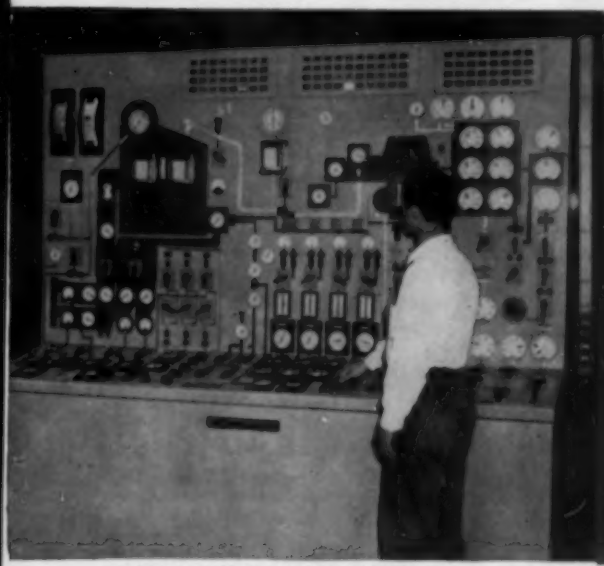
BOILER CONTROL

A Copes-Vulcan Combustion Control System accurately regulates the fuel and air for proper combustion. Copes Type 3-L Feed Water Control matches the feed flow to the steam demands and maintains a constant drum level. Copes provided 10-inch, 1500 pound standard motor-operated feed water by-pass control valves. Copes-Vulcan control and valves give automatic recirculation for protection of three boiler feed pumps.

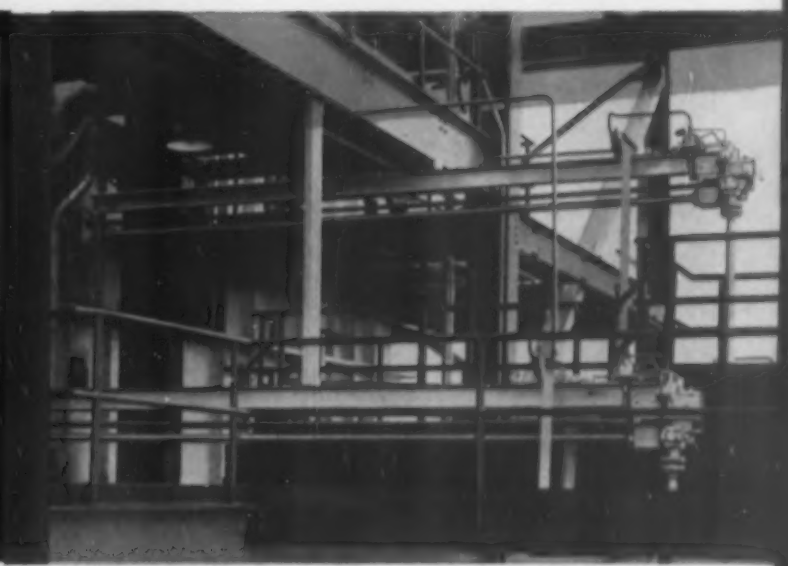
BOILER CLEANING

The Vulcan Automatic-Sequential Soot Blowing thoroughly cleans the heating surfaces. Air is the blowing medium in both units. Air motors drive the blowers in Unit 1; Electric motors drive those in Unit 2. Cleaning elements include Vulcan long retractables, wall deslaggers, rotaries, and air preheater cleaning controls.

Write for complete information about Copes-Vulcan Boiler Controls and Soot Blowers.



COMPACT OPERATING PANEL. There is one operator in the central control room at the Louis V. Sutton Generating Plant.



DUAL-MOTOR DRIVE on these Vulcan Long Retractables and the Vulcan Wall Deslaggers give more complete cleaning than single-motor drive, leaving *no* surface unblown.

COPES-VULCAN DIVISION

CONTINENTAL FOUNDRY & MACHINE COMPANY

ERIE 4, PENNSYLVANIA

COPES VULCAN

NEWS *for the South and Southwest*

Cleco Div.—Atlanta

GLENN O. LOGAN was recently promoted to Division Manager of the Atlanta Sales Division of CLECO DIVISION of Reed Roller Bit Co., Houston, Texas, according to an announcement made by T. E. Donohue, Sales Manager of Cleco.

Glenn O. Logan

Mr. Logan has been with the company in the Atlanta area as a Special Salesman since 1948.

Southern Water Conditioning Expanding Sales Activities

Meeting the demands for growing Southern industry, SOUTHERN WATER CONDITIONING, INC., 315 15th Ave. South, St. Petersburg 5, Florida, is expanding its operation to provide service for the entire South, according to N. B. GRAHAM, Executive Vice President and General Manager.

Producing a complete line of water conditioning equipment, the firm began operations in Florida two years ago and until this time has been serving needs of Florida industry, making representative installations in the industrial, institutional, boiler plant, laundry, hotel and various other fields.

Though comparatively new as an organization, Southern Water Conditioning offers a wealth of experience in personnel. Graham is well known in the field, primarily through his 19-year association with Elgin Softener Corporation. Graham started with Elgin as salesman, later became district manager and finally manager of industrial sales.

During World War II, Graham was associated with Woodruff & Edwards as assistant to the president in charge of postwar planning and research. In this capacity he was instrumental in the acquisition of the Wade Manufacturing Company, Water Hammer Arrester Corp.—later combined with Wade Manufacturing—and Elgin Windmill. He was later appointed executive vice president for both corporations.

About the end of the war, Graham resigned from the above companies, due to his health, and moved to Florida where he was active in the organization of a manufacturer's agency and in designing and building boiler plants.

N. B. Graham is Executive Vice President and General Manager of Southern Water Conditioning, Inc.

Graham spent a short period in California for the Roper Manufacturing Corporation of El Monte, organizing for this firm an industrial water softening department.

W. F. HUESTON, President of Southern Water Conditioning was formerly treasurer of Standard Steel Springs, Inc., and has been associated in an executive capacity with several other national organizations. EDWARD REIF, secretary, provides years of experience in the pump and mechanical industries. He was most recently Purchasing Agent and Traffic Manager for General Pump and Equipment Corporation.

Southern Water Conditioning, Inc. is producing manually operated, semi-automatic and automatic water softeners as well as filters of all types, aerators, degasitors, chemical treatments, chemical treating systems and demineralizers. Research work is underway on a new type of softener.

The decision to locate in the southeast was dictated by the growing demand for water conditioning equipment in this area.

Hugh J. McKane

Southern District Manager For Bay State Abrasives

HUGH J. MCKANE, Atlanta, Georgia, has been promoted to the position of district manager of the southern area for BAY STATE ABRASIVE PRODUCTS CO., Westboro, Mass.

He will supervise sales activities in North Carolina, South Carolina, Georgia, Florida, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma and Texas.

Mr. McKane joined Bay State in November, 1948, as an Abrasive Specialist with headquarters at Bay State's Chicago District Office. Subsequently, he was transferred to the southeastern area as an Abrasive Engineer. He came to Bay State after fourteen years of employment with the Carborundum Company, Niagara Falls, New York.

Connors Steel Expanding Birmingham Operation

Announcement of a $2,500,000 expansion for CONNORS STEEL DIVISION of H. K. Porter Company, Inc., was made recently by T. M. Evans, president of H. K. Porter.

The expansion of Connors, at Birmingham, Alabama, will center

MORE STEAM
when you need it with QC water tube BOILERS!

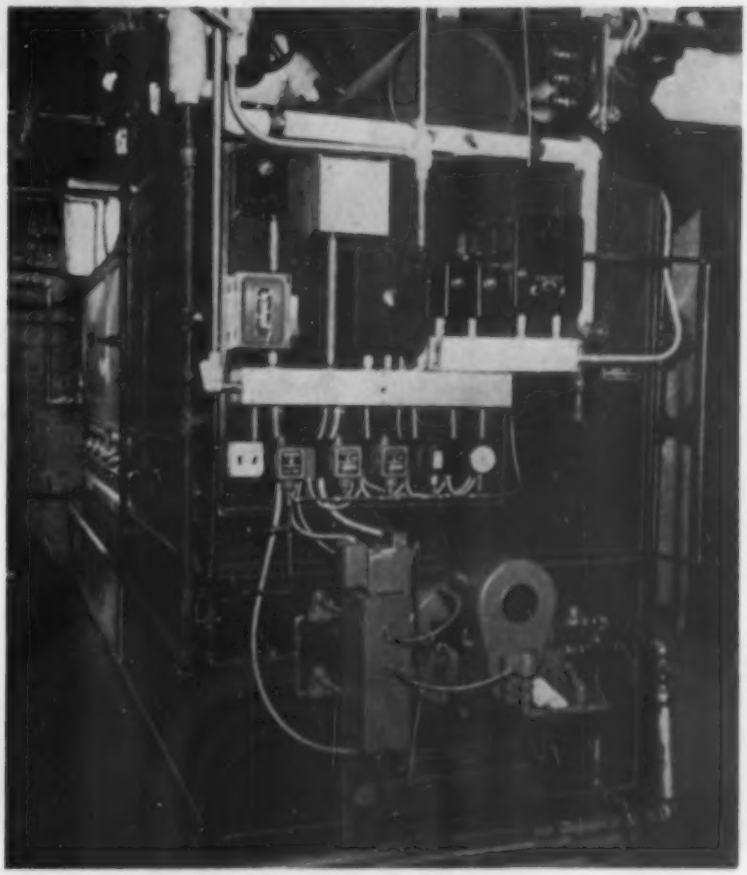


Photo shows typical installation of a 100 hp QC Boiler

Capacity of 100 hp QC Boiler

Minimum Safety Valve Capacity (ASME Code)

6578 lbs. steam per hour

QC Boiler Delivered Steam, continuous operation

4313 lbs. steam per hr.

QC Boiler Horsepower Rating (100 hp)

3450 lbs./steam/hr.

Have more steam readily available . . . fast . . . for extra loads when needed or for increased production facilities!

The large reserve capacity of QC Boilers gives you this advantage PLUS normal continuous operation at maximum efficiency.

Your steam capacity stays UP . . . your cost stays DOWN . . . all the time!

QC "bent tube" water tube boilers cost less to operate and require less maintenance. Side panels are easily removable for cleaning and for boiler inspections. Coal, gas or oil-fired . . . from 10 to 350 hp.

For *more* steam, *faster* steam and *drier* steam at less cost, install a QC Boiler in your plant!

For complete information, write

Queen City Engineering Co.

P. O. Box 3103

CHARLOTTE • NORTH CAROLINA

around the establishment of the first fully integrated cold finished steel bar operation in the South. Included in the program, which is expected to be completed early in 1956, are additional scrap-handling facilities, an additional electric furnace, improved rolling facilities plus equipment for the new cold finished bar mill.

B. C. Blake, vice president and general manager of Connors, said the new facilities will boost Connors ingot production from 85,000 tons per year to about 110,000 tons.

Frick Company—New Orleans

FRICK COMPANY has announced the appointment of JOHN T. SANDERS III as Manager of its Branch Office in New Orleans.

Mr. Sanders is a graduate in engineering at the Rice Institute at Houston, and has been selling Frick refrigerating and air conditioning equipment in the area for the past 8 years. He is a Registered Professional Mechanical Engineer in the State of Texas.

The Frick Branch Office in New Orleans is at 235 Humble Building, 909 South Jefferson Davis Parkway.

Cochrane—Tennessee

Cochrane Corporation, of Philadelphia, Pa., has announced the appointment of: DICKEY ENGINEERING COMPANY, 2721 Central Ave. N.W., Knoxville, Tennessee, as sales representative in Tennessee.

Mobile Transformer Serves Louisville Area

Believed to be the largest mobile transformer ever built, this 25,000 kva unit has been delivered by General Electric to the LOUISVILLE GAS AND ELECTRIC CO., where it will be used as a replacement in emergencies and for routine maintenance work.

A forced-oil, forced air-cooled unit, it has four windings for connection to circuits of 138,000 volts, 37,000 volts and 14,000 volts. Any combination of the four voltage ratings may be used, giving the unit great flexibility in service.

The transformer is mounted on a 16 wheel carryall trailer. Maximum width is 11' 8" and maximum height is 15 ft. Thirteen bushings, four two-fan cooling units and a housing containing controls, metering and differential relaying equipment, are integral parts of the transformer.

Numerous large chemical plants in the Louisville area make it essential to deal swiftly with emergency outages, since a power failure could be costly as well as dangerous at these plants.

Shreveport, La. Office For Sims Valve Co., Inc.

MR. JOHN HANKS, 450 Albany Avenue, Shreveport, La., has been appointed as the SIMS PUMP VALVE COMPANY representative for the East Texas-Louisiana area.

FUTURE EVENTS
Of Engineering Interest

INSTRUMENT SOCIETY OF AMERICA, 1315 Allegheny Ave., Pittsburgh 33, Penna.
Sept. 10-13, 10th Annual Intrument-Automation Conference and Exhibit, Shrine Exposition Hall and Auditorium, Los Angeles Calif.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS, H. M. Stewart, Chm. of Conference, P. O. Box 2827, Baytown, Texas.
Sept. 12-14, Electrical Conference of the Petroleum Industry, Shamrock Hotel, Houston, Texas.

PUBLIC UTILITIES ASSOCIATION OF THE VIRGINIAS, Robert W. McKinnon, Exec. Sec'y, 5 Franklin Road, Roanoke, Va.
Sept. 15-18, 37th Annual Meeting, Greenbrier Hotel, White Sulphur Springs, W. Va.

SOUTHEASTERN ELECTRIC EXCHANGE, J. W. Talley, Mg. Dir., 303 Haas-Howell Bldg., Atlanta 3, Ga.
Sept. 23-23, Engineering & Operating Section Charlotte Hotel, Charlotte, N. C.
Oct. 27-28, Sales Conference, Biltmore Hotel, Atlanta, Ga.

AMERICAN SOCIETY OF LUBRICATION ENGINEERS and **AMERICAN SOCIETY OF MECHANICAL ENGINEERS,** Lubrication Activity Group, E. M. Phillips, Sec'y, 5 Westminster Road, Marblehead, Mass.
Oct. 10-12, Second Lubrication Conference, Antlers Hotel, Indianapolis, Ind.

AMERICAN SOCIETY FOR METALS, William H. Eisenman, Sec'y, 7301 Euclid Ave., Cleveland 3, Ohio.
Oct. 17-21, National Metal Exposition and Congress, Commercial Museum and Convention Hall, Philadelphia, Pa.

NATIONAL ASSOCIATION OF CORROSION ENGINEERS, A. B. Campbell, Sec'y, 1061 M & M Bldg., Houston 2, Texas.
Oct. 18-21, South Central Region Meeting, Houston Hilton-Shamrock Hotel, Houston, Texas.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, E. K. Stevens, Mgr. International Exposition Co., 480 Lexington Ave., New York 17, N. Y.
Nov. 14-18, Chicago Exposition of Power & Mechanical Engineering, Chicago Coliseum, Chicago, Ill.

AIR CONDITIONING & REFRIGERATION INSTITUTE, Washington, D. C.
Nov. 28-Dec. 1, 9th Annual Air Conditioning & Refrigeration Exposition, Auditorium, Atlantic City, N. J.

25TH EXPOSITION OF CHEMICAL INDUSTRIES, E. K. Stevens Mgr., International Exposition Co., 480 Lexington Ave., New York 17, N. Y.
Dec. 5-9, Exposition, Commercial Museum and Convention Hall, Philadelphia, Pa.

EDISON ELECTRIC INSTITUTE, 420 Lexington Ave., New York 17, N. Y.
Feb. 6-10, National Industrial Electric Heating Conference, Netherland Plaza Hotel, Cincinnati, Ohio.

More News—Page 101

EASY TO SERVICE...

a plus value of ASHCROFT

Maxisafe DURAGAUGES

Turn the knob on the back of the *Maxisafe* and the plate comes off, fully exposing the entire mechanism for fast and easy inspection, recalibration or adjustment. This time and money-saving feature is highly favored wherever Ashcroft *Maxisafe* Duragauges are in service.

This Duragauge was named *Maxisafe* because it has an integrally-cast wall to separate the dial from the movement and Bourdon Tube assembly — a solid wall of safety that protects the viewer if the tube ever ruptures. Covering the back of the case is a double spring mounted safety release plate — a Teflon-coated plate tightly fitted on a rubber gasket and held in place by a knurled knob. Less than 0.5 psi pressure created by a ruptured tube forces this cover open — vents the discharge safely to the rear.

The Maxisafe is available in 4½", 6" and 8½" dial sizes. You can have a choice of standard Ashcroft Duragauge pressure ranges, case designs (except Types 1179 and 1279), and mountings. Get the utmost in sustained accuracy, durability, protection and convenient servicing. Specify Ashcroft *Maxisafe* Duragauges.

YOUR INDUSTRIAL SUPPLY DISTRIBUTOR has complete facts about Ashcroft Gauges of all types. You can depend on his knowledge and experience to help you satisfy every requirement of the application. He maintains local stocks to serve you promptly and economically.

ASHCROFT GAUGES

A product of **MANNING, MAXWELL & MOORE, INC.** STRATFORD, CONNECTICUT

MAKERS OF 'ASHCROFT' GAUGES, 'AMERICAN' AND 'AMERICAN-MICROSEN' INDUSTRIAL INSTRUMENTS, 'HANCOCK' VALVES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, AIRCRAFT PRODUCTS. BUILDERS OF "SHAW-BOX" AND 'LOAD LIFTER' CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.

. . . for LOW COST STEAM TOMORROW
buy a SUPERIOR STEAM GENERATOR TODAY

Superior Steam Generators encompass the most complete line of packaged boilers available. Write for complete details today.
Fire Tube types to 600 b.h.p. (Write for Catalog 711 F).
Water Tube types to 45,000 lbs./hr. (Write for Catalog 711 W).

Man will reach the moon . . . tomorrow perhaps . . . but more than likely "tomorrow" in the dictionary of scientists means 20 years . . . and that's a long time to pay the penalty of high steam costs. A boiler is a long term investment; and the equipment you buy today determines your steam costs for years to come.

Superior Steam Generators are designed and built to last longer, and to operate at higher efficiencies throughout their entire serviceable life. Evidence of this you can see for yourself in Superior's bigger, heavier construction and completely integrated design. Superior Steam Generators provide more steam per dollar over a longer serviceable life.

for performance you can **BANK** *on*

SUPERIOR COMBUSTION INDUSTRIES INC.
TIMES TOWER, TIMES SQUARE, NEW YORK 36, N.Y.

SUPERIOR
STEAM GENERATORS

WHERE TO GET IT *And How to Do It*

-INDEX OF HELPFUL BOOKLETS, BULLETINS, REFERENCE LITERATURE-

Cooperating with leading manufacturers of equipment and supplies, SPI makes available for the asking without cost or obligation, the following valuable bulletins, booklets, handbooks and catalogs.

Check the list, fill in Coupon, mail to SOUTHERN POWER & INDUSTRY. (Coupon Post Cards on pages 17 and 18.) This service restricted to those interested in the operation or design of Industrial, Power and Service Plants.

STEAM TURBINES . . . FURNACES BOILERS, STOKERS, BURNERS

29 **CONTINUOUS BLOW-OFF**—Bulletin, 8 pages—Gives the basic facts about boiler blow-off, and describes the Madden system of control of continuous blow-off for the removal of solids and impurities from steam releasing surfaces.—THE MADDEN CORPORATION.

37 **STEAM BOILERS**—Bulletin SB-50, 16 pages—Describes and illustrates complete line of steam generating equipment, with sectional views, diagrams, plant applications. Condensed reference material for consulting and power engineers.—ERIE CITY IRON WORKS.

46 **AIR PREHEATERS**—Bulletin "The Ljungstrom Air Preheater," 36 pages—Explains fuel savings and increased performance possible by using waste heat in flue gases to preheat incoming combustion air. Explains operation, construction and economy of gas-to-gas preheaters of the continuous regenerative type.—THE AIR PREHEATER CORP.

51 **WATER-TUBE STEAM GENERATOR**—Booklet "Type A," 8 pages—Gives data and specifications for complete factory assembled steam generator units in nine sizes, from 5300 to 32,000 lb per hr, for pressures up to 400 psi, designed to provide fully automatic firing with oil, gas or stoker-fired coal.—SUPERIOR COMBUSTION INDUSTRIES, INC.

56 **WATER TUBE BOILERS**—Booklet—Describes details of stoker—oil or gas or combination gas/oil, 10 to 350 hp to 250 psi; designed for easy conversion to any fuel.—QUEEN CITY ENGINEERING COMPANY, INC.

58 **OIL BURNERS**—Bulletin 24—Describes the SAL steam atomizing oil burner, a large capacity unit with great flexibility of performance. Fewer burners with higher performance. NATIONAL AIR-OIL MFG. CO., INC.

63 **PNEU-BLAST SOOT BLOWING**—Bulletin 1015, 4 pages—Describes Vulcan Pneu-Blast, or intermittent-air, soot blowing system, illustrated with operating diagrams and installation photographs.—COPES-VULCAN DIVISION, CONTINENTAL FOUNDRY & MACHINE CO.

75 **INDUSTRIAL BURNERS** — Form AD-101, 4 pages—Describes and illustrates the Hev-E gas and combination oil and gas burners for commercial and industrial use. Also described are the forced draft system and electronic controls, with charts showing capacities for five models.—CLEAVER-BROOKS COMPANY.

81 **FLY ASH AND DUST RECOVERY**—Engineering Booklet—Gives data and illustrations on the multicione mechanical dust collector, showing basic principles and typical application for dust and fly ash recovery.—WESTERN PRECIPITATION CORP.

86 **PULVERIZED FUEL SYSTEMS**—Bulletin, 39 pages—Gives information based on 50 years' experience in steam generation; well illustrated with cross-sectional drawings and graphs—gives advantages, typical installations, and descriptions of major operating parts. — FOSTER WHEELER CORP.

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9-55-2

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936	937	994	U-1	U-2	U-3	U-4	U-5	U-6	U-7	U-8	U-9	U-10	U-11	U-12	U-13	U-14
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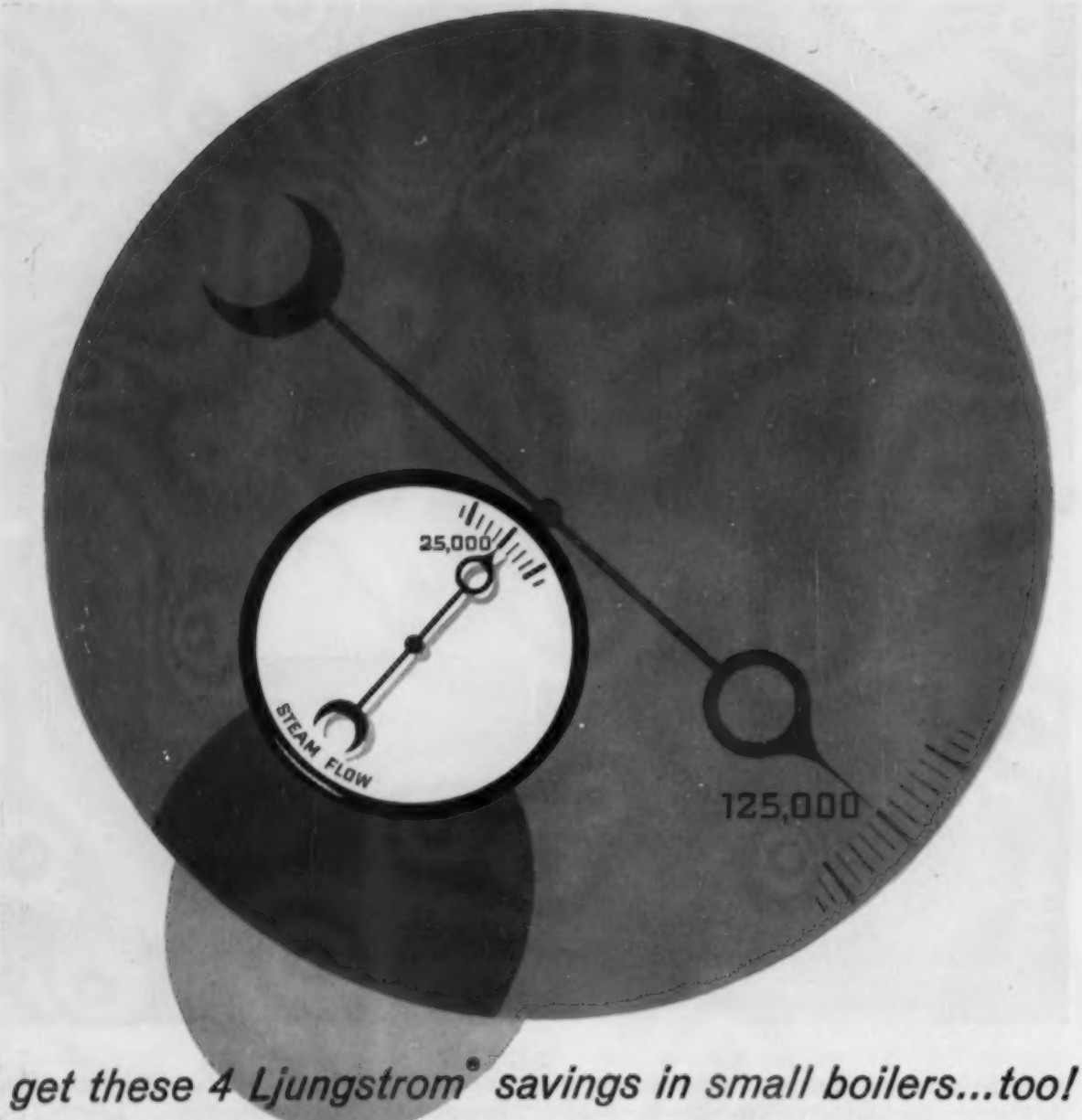

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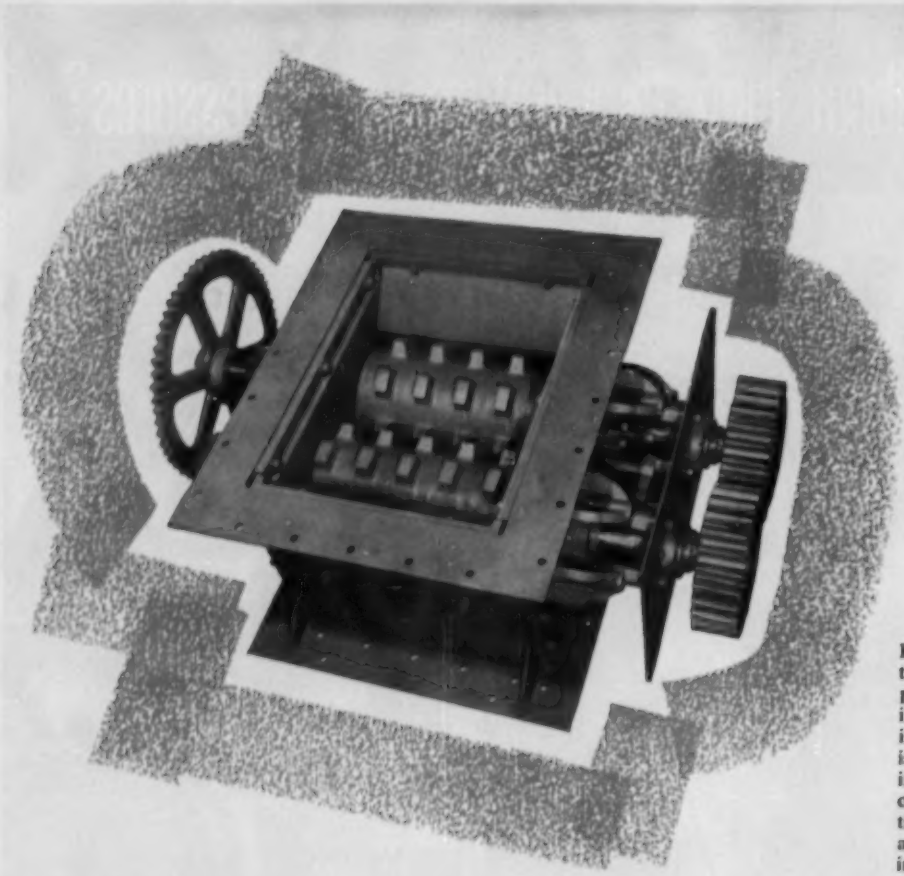

Double roll construction of the A-S-H Clinker Grinder permits more efficient crushing. Unit can be installed in a closed system. Grinder is equipped with two 10-in. diameter rolls mounted on 12-in. centers for reduction of material to 2" diameter. Rolls are available in either 2 or 3 foot lengths.

New model double roll A-S-H clinker grinder assures uniform reduction of ash and slag

No more uneven sizing of ash and slag. No more clogging on wet materials. Will operate with rolls submerged. The A-S-H Clinker Grinder is especially designed to end these grinding problems.

Handles large clinkers — produces uniform product. This time-tested double roll design lets the A-S-H Clinker Grinder handle larger pieces . . . wet or dry . . . crush them more efficiently . . . with less grinder wear . . . and maintain the desired maximum size of end product.

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Simplifies installation and maintenance. Grinder is a compact unit with rolls mounted in a fabricated steel housing so it can be installed in a closed system . . . and easily withdrawn *as a unit* for overhaul.

Grinds either wet or dry material. There's no danger of damage from water, grit or dust because bearings are mounted outside shaft stuffing boxes and are protected by lantern rings. With dry material, compressed air sweeps through glands and bearings to prevent entrance of grit. With wet material, water is used.

For more information on the A-S-H Double Roll Clinker Grinder write to Dept. A-2 at the address below.

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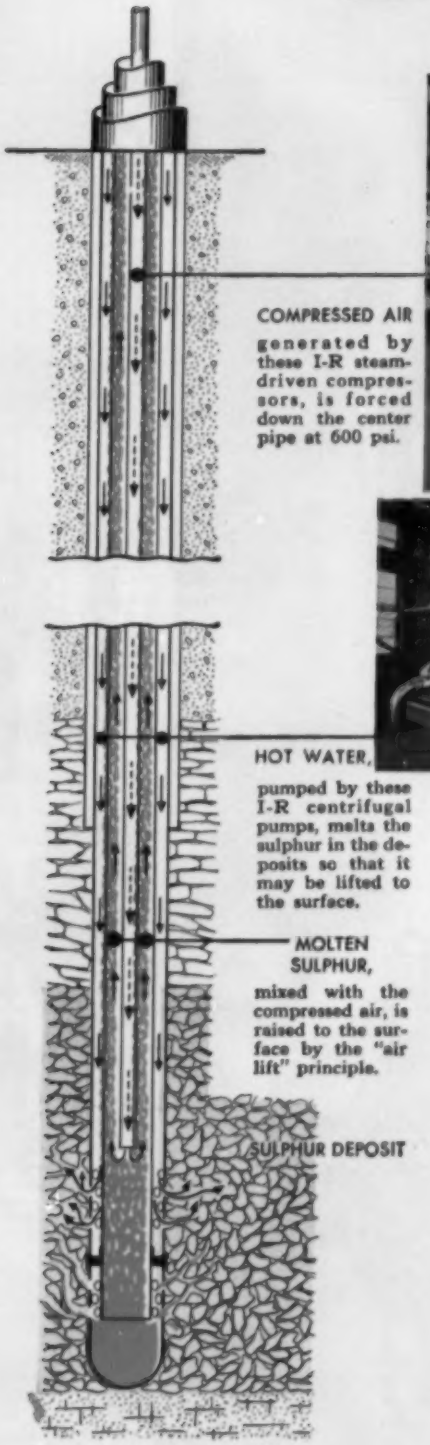
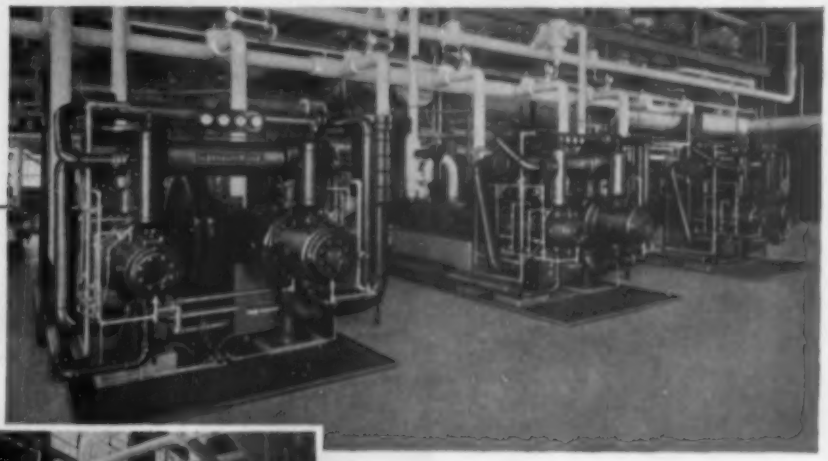
I-R "AIR LIFT" raises sulphur at SPINDLETOP





Newest plant of Texas Gulf Sulphur Company mines molten brimstone with Ingersoll-Rand air and water power

Here at the Spindletop mine of the Texas Gulf Sulphur Company, near Beaumont, Texas, a huge underground deposit containing thousands of tons of sulphur is being brought to the surface in liquid form by the modified Frasch process illustrated at the left. The only mining "tools" are air and hot water. Compressed air forced down the center pipe mixes with the melted sulphur and raises it to the surface by what is in effect an "air lift".

Once started, this operation never stops. Hence the *dependability* of Ingersoll-Rand equipment is particularly important. Power for the "air lift" is provided by the Ingersoll-Rand Type XPV 4-stage steam-driven compressors shown above. And hot water is pumped into the wells to melt the sulphur by a battery of I-R Type JVL centrifugal pumps.

This is another example of how I-R equipment is serving vital industries the world over. Ingersoll-Rand compressors are built in sizes from ½ to 4,000 hp, for pressures ranging from vacuums to 22,000 psi — with any type of drive. Whatever your compression problem, your nearest I-R engineer has the answer.

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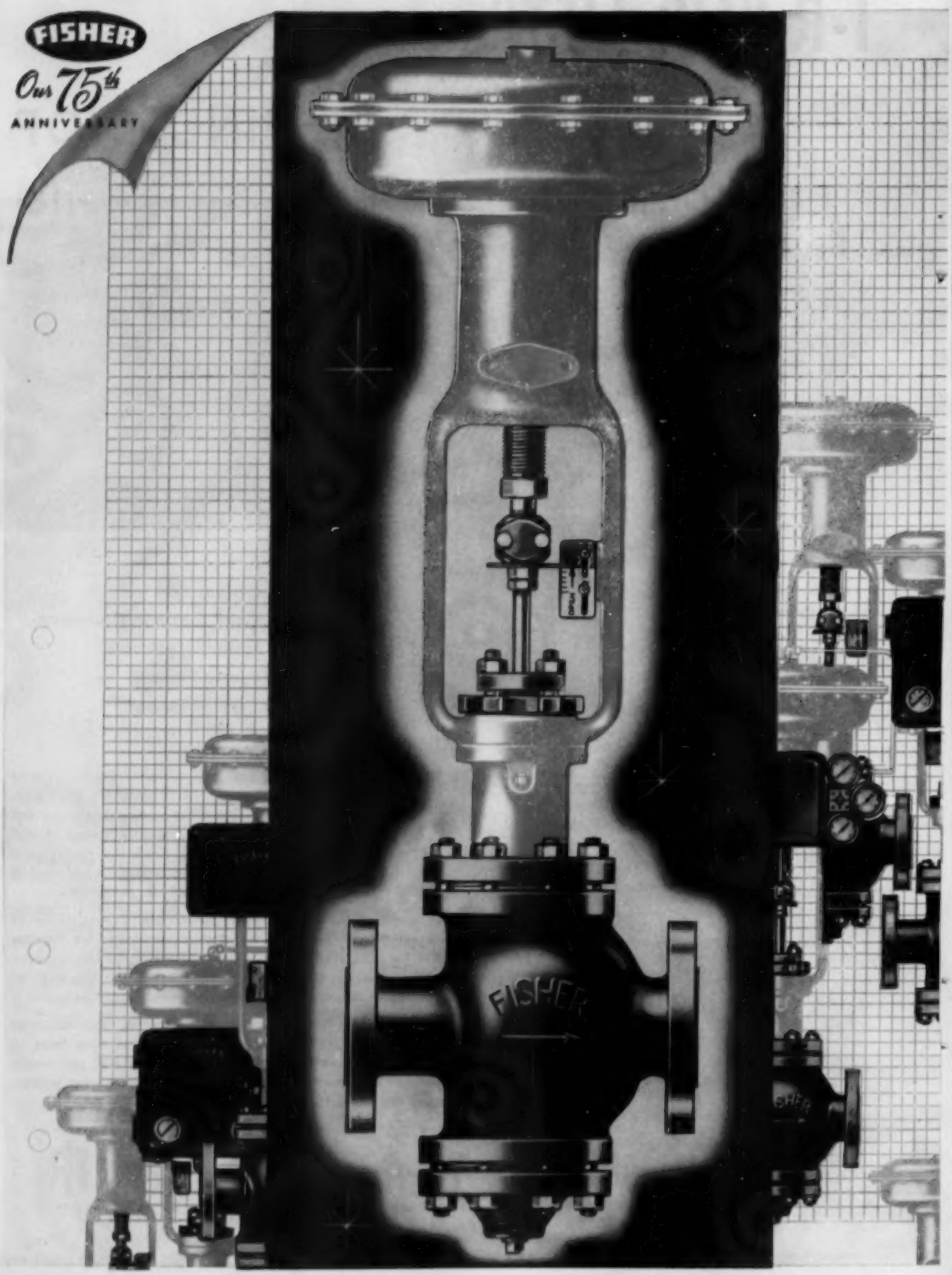
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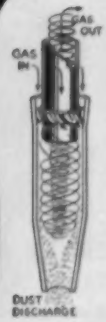
In fly ash recovery

MULTICLONE COLLECTORS

***and only Multiclones* give vital advantages like these . . .**



Uniformly High Recovery:

MULTICLONE's multiple *small diameter* tubes—made possible by its exclusive vane design—whirl the dirty gases with greater centrifugal force, thus throwing out not only the large, medium and small particles, but also a high percentage of the *extremely small* particles of 10 microns and less. This, coupled with the fact that there are no pads or filters to become choked with recovered material, results in a more complete recovery of *all* suspended materials from the gas stream.

Long and narrow

Square

Maximum Adaptability:

In addition to its unusual compactness, the MULTICLONE is also unusually adaptable to various installation requirements. Where head room is low it can be installed with side-inlet side-outlet connections. Where side clearances are restricted, it can be installed with side-inlet top-outlet connections. In addition, without changing capacities, the shape of the unit can be varied—long and narrow, short and wide, or square—to fit restricted spaces . . . and its single-inlet single-outlet duct requirements permit greater flexibility and simpler installation. These savings slice installation costs, space requirements and insulating expense.

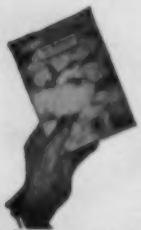
Space-Saving Compactness:

Plant space costs money—so be sure to check space requirements carefully. As shown in the accompanying chart, the MULTICLONE requires less floor space and less cubic space than any other unit of comparable capacity and performance. Translate these savings into today's high costs for plant space and you readily see the great importance of this one MULTICLONE advantage alone!

Make	Relative Space Requirements In Sq. Ft.	In Cu. Ft.
Multiclone	1.0	1.0
Collector A	2.1	1.0
Collector B	5.9	3.2
Collector C	6.8	3.9

Minimum Maintenance:

The MULTICLONE has no high speed moving parts to repair or replace . . . no pads or filters to clean or renew . . . nothing to choke the gas flow or increase draft losses as suspended materials are recovered. MULTICLONE draft losses remain uniformly low *at all times*. Further, the recovered material from an entire bank of tubes is collected in a *single* hopper—far easier to service and maintain than the multiple hoppers of conventional cyclone units.



FREE INFORMATIVE BOOKLET
This 32 page booklet outlines the basic principles of centrifugal dust recovery and shows the many ways MULTICLONE advantages assure higher recovery at lower overall costs. A free copy of this booklet will gladly be sent on request. Write today!

Before you decide on *any* recovery equipment be sure to get complete information on MULTICLONE advantages. A letter, wire or phone call to our nearest office places this information in your hands without obligation. Get *all* the facts and you will get MULTICLONE Collectors!

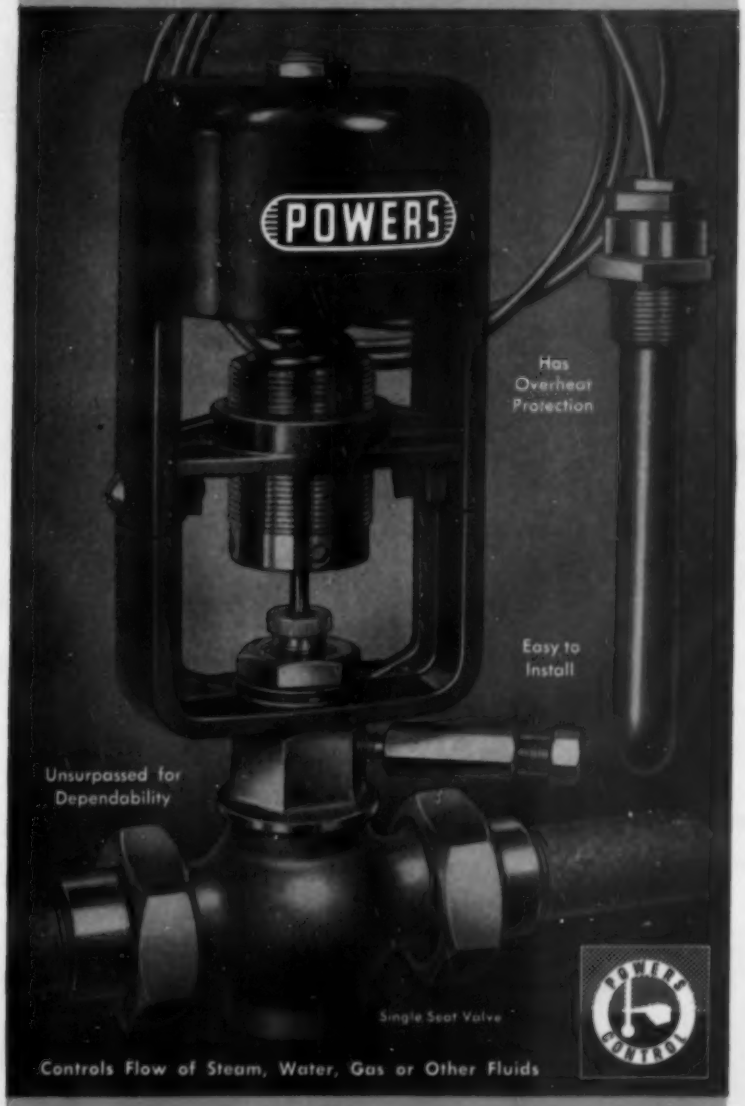
WESTERN Precipitation CORPORATION

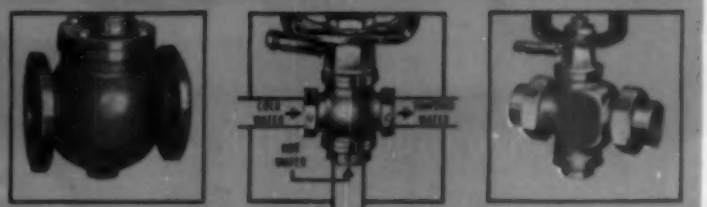
DESIGNERS AND MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

Main Offices: 1052 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA
CHRYSLER BLDG., NEW YORK 17 • 1 N. La SALLE ST. BLDG., CHICAGO 2
3252 PEACHTREE RD. N.E., ATLANTA 5 • HOBART BLDG., SAN FRANCISCO 4
PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

POWERS No. 11 Self-Operating TEMPERATURE REGULATOR

Automatically holds temperature constant at the right point. Prevents losses caused by wasteful OVER-heating.

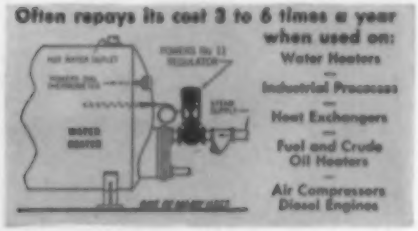




Various Valve Bodies and Inner Valves are available. Single and Double Seat Valves thru 2" have rugged bronze bodies with bronze union connections for quick, easy installation. Bulletin 329 gives information about all types.

(o88)

Why It Gives BETTER CONTROL and Saves More Money



ONLY POWERS No. 11 REGULATOR Offers ALL These Advantages

- **Simple, sturdy construction.** Materials used are corrosion resistant.
- **Powers bellows has 50% more power** than used in the majority of regulators. The heart of a self operating regulator is its bellows. Powers with its 50% greater effective area gives better control and its durable 2 ply bellows outlasts ordinary single ply bellows.
- **Valve stem lubricator** with silicone grease aids easy movement of highly polished stainless steel valve stem and reduces drying out of packing.
- **BETTER CONTROL** results from Powers powerful bellows and minimum of valve stem friction.
- **60°F. temperature ranges** available with accuracy of ±1°F. on some processes and 2 to 3°F. on others.
- **Rugged bronze valve bodies with bronze union connections,** for single and double seat valves thru 2", reduce installation time and labor. Larger sizes have flanged iron body valves.
- **Powers Nationwide Service and 24 Hour Delivery** in the U.S.A. are important time and money saving advantages.

- **Indicating Regulator** with easy to read 4" dial thermometer helps adjust the regulator and check temperature at the bulb. Various dials and ranges are available.

Right type and size of valve is important for good control. May we help you make the right selection? Benefit from POWERS more than 60 years experience with self-operating regulators.

Call our nearest office or write us direct for Bulletin 329.

THE POWERS REGULATOR CO.

Skokie, Ill. | Offices in Chief Cities in U.S.A.
Canada and Mexico | See your phone book

Automatic Temperature and Humidity Control

Established 1891

1333 Spring St., Atlanta, Ga.—101 N. Elm St., Greensboro, N. C.

SPANG® CW STEEL PIPE GIVES
TOP-QUALITY SERVICE AT MERRY ACRES MOTEL

Merry Acres Motel, situated on ten acres of beautiful ground in a quiet suburban section of Albany, Georgia, is typical of the many new motels that line our highways, offering *top-quality* service to motorists. Each of the 33 rooms at Merry Acres was planned to give overnight guests maximum comfort and convenience.

To assure a *top-quality* plumbing installation in each room, 2,165 feet of SPANG CW Steel Pipe were installed. The specs called for SPANG CW, not only because it is easy to work with, but also because it has a *top-quality* reputation for giving years of dependable service. These two important factors are the result of SPANG'S careful *quality-control.*

This *quality-control* begins with the selection of *top-grade* skelp, continues through the close control of the manufacturing process, and includes the final inspection and testing of the finished pipe.

Quality-controlled SPANG CW is easy to bend, cut, thread and weld. It has strong, uniform welds; smooth, clean inside finish; uniform diameter . . . all important features in lowering installation time and costs.

Why don't you take advantage of SPANG'S *quality-control?* Whatever your piping needs may be—radiant heating, snow-melting, plumbing, air conditioning or water lines—SPANG CW Steel Pipe will give you *top-quality* service. See your local SPANG Distributor, for your next order of pipe. He will give you *top-quality* service, too.

SPANG-CHALFANT
DIVISION OF THE NATIONAL SUPPLY COMPANY

General Sales Office: Two Gateway Center, Pittsburgh, Pa. District Sales Offices: Atlanta, Boston, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis

SPANG CW STEEL PIPE

Owner and Builder: G. G. Dozier, Albany, Georgia
Architect: Rayburn Webb, Albany, Georgia
Plumbing Contractor: Lipsey Heating and Plumbing Company, Albany, Georgia
Spang Distributor: Engineering and Equipment Company, Albany, Georgia

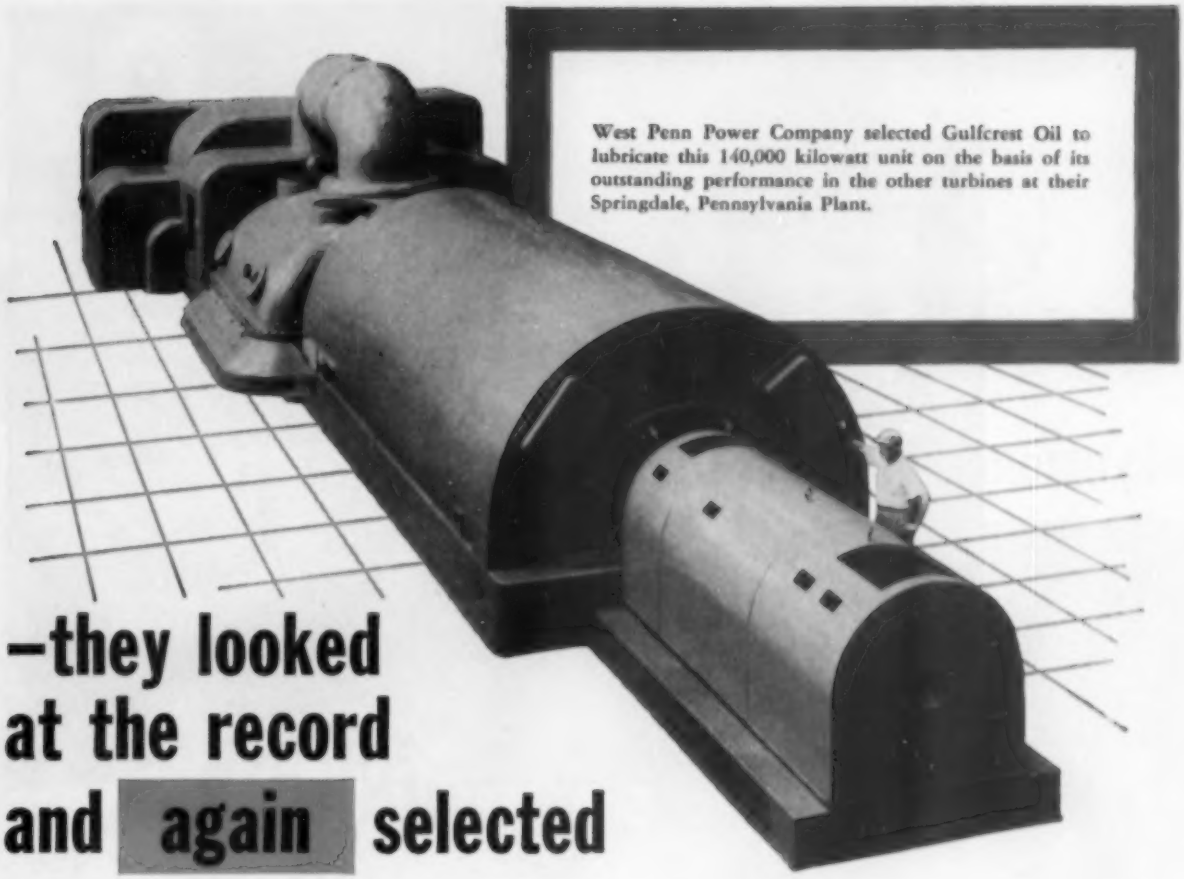
$ $ $
For Your Ideas

SP&I's "Helping the Man-in-the-Plant" department (see page 78) features, ideas, methods and gadgets — many plant-tested in Southern and Southwestern industrial, power and service plants.

Send your ideas, methods and short-cuts to Southern Power & Industry. Payment is made for suitable material—a photo or rough sketch will make your idea more valuable.

Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

Southern Power & Industry
806 Peachtree St., N.E.
Atlanta 5, Georgia



West Penn Power Company selected Gulfcrest Oil to lubricate this 140,000 kilowatt unit on the basis of its outstanding performance in the other turbines at their Springdale, Pennsylvania Plant.

—they looked at the record and again selected

GULFCREST OIL

When the West Penn Power Company looked at the record of Gulfcrest Oil in its seven turbine units at Springdale, the choice of lubricant for Number Eight was no problem—Gulfcrest again!

Here's what the record showed: In each of the seven units the original fill of Gulfcrest had been in service for years without any significant changes in its characteristics. And of course the turbines operated continuously and dependably during this period.

A record like this did not just happen. It is the result of careful selection of crude oils that are thoroughly refined, then super-refined by Gulf's exclusive Alchlor Process, which removes the unstable hydrocarbons that remain after normal refining. This discarded portion, if allowed to remain in a turbine oil, accelerates oxidation, increases neutralization number, forms sludge, and harmful acids.

So to insure safe, long-lasting protection for your turbines, specify Gulfcrest—the world's finest turbine oil. Contact your nearest Gulf office today and have a Gulf Sales Engineer recommend the proper grade.

GULF

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

GULF OIL CORPORATION • GULF REFINING COMPANY

1822 GULF BUILDING, PITTSBURGH 30, PA.

TRADE FRICK MARK®

Air Conditioning

SERVES THE CLARIDGE HOTEL AT MEMPHIS 21 YEARS!

Back in 1934 the Coffee Shop and Twentieth Century Ball Room at the Claridge were among the first in Memphis to be air conditioned. Two years later a Frick ice-making system was installed, and in 1941 additional cooling capacity for air conditioning. Now the top nine floors have been given the benefit of Frick air conditioning.

What a boon to guests and staff, alike! And what a tribute to Frick equipment, which cools the entire 15-story building! Seven Frick heavy-duty compressors carry the load.

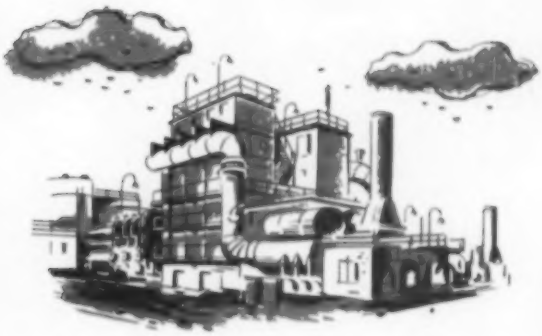
Whether you operate a hotel, restaurant, hospital, store, office, or industrial plant, there's a Frick air conditioning system to meet your exact needs. Also refrigerating, ice making and quick-freezing equipment in all commercial and industrial sizes. Our complete engineering, manufacturing, installation and maintenance service is offered alike to owners and to engineer-contractors. Get literature and estimates now on dependable Frick air conditioning and refrigeration. Visit, phone or write

Frick Bulletin 504 features general air conditioning; 505 shows engineering details of Frick systems; 522 describes Frick unit air conditioners. See also the Frick pages in Sweet's Catalogs.

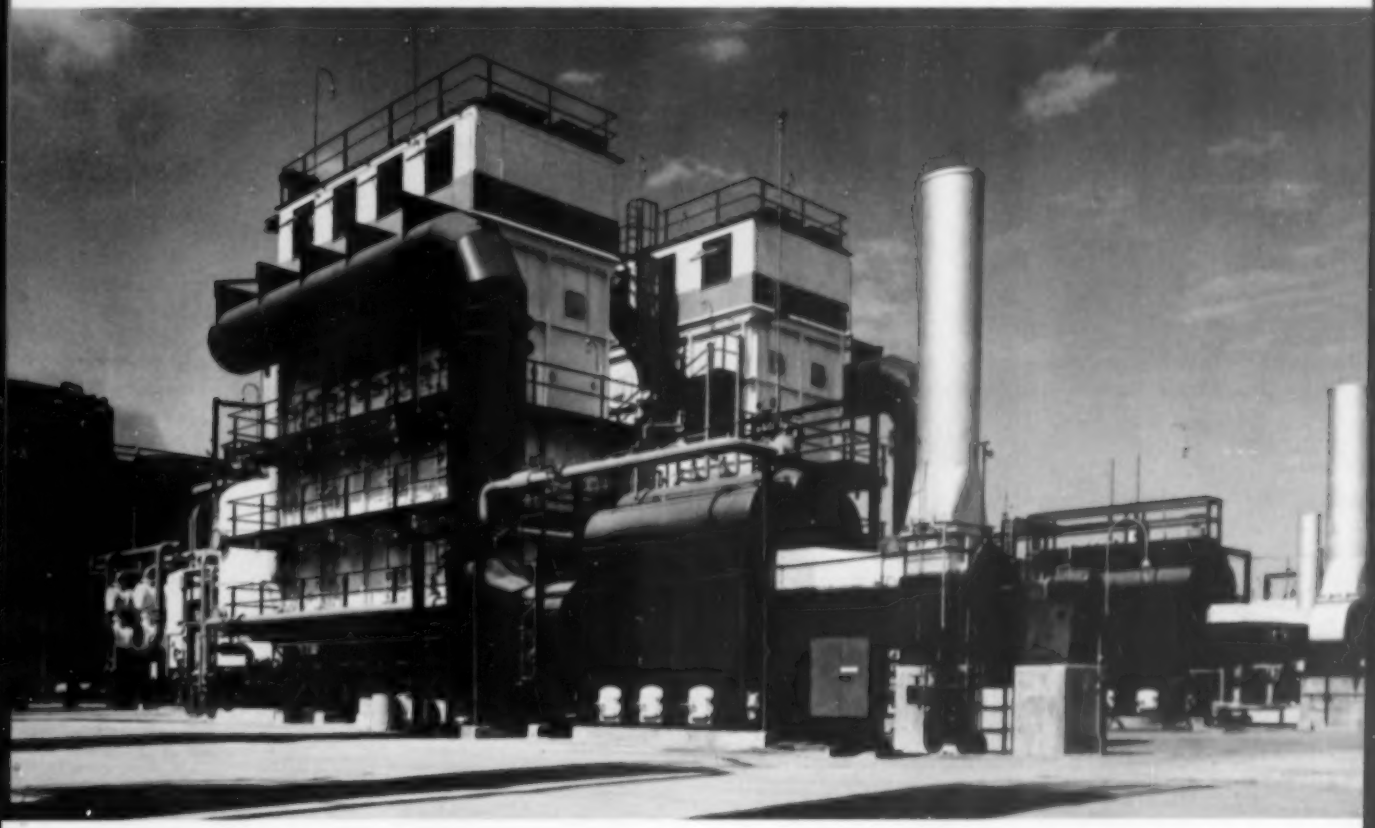
DEPENDABLE REFRIGERATION SINCE 1882

FRICK CO.

WAYNESBORO, PENNA. U.S.A.



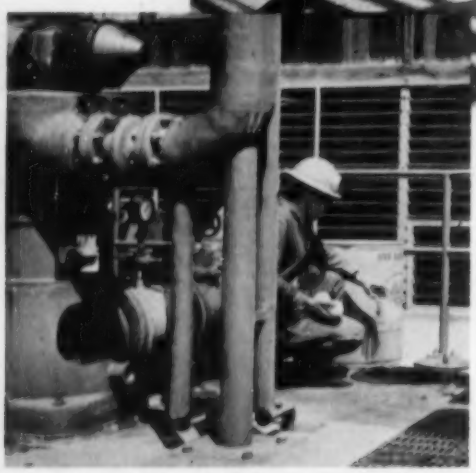
Water treatment by NALCO protects boilers and cooling system of a big new ammonia plant



Processing units (left) and Nalco-protected waste heat boilers in new $13 million Brea Chemicals, Inc. ammonia plant.

When $13,000,000 goes into a brand new ammonia plant . . . equipment, services and supplies must be right up to snuff from the start. The Nalco System has been working here from the beginning—and the Nalco treatments and services rendered in a successful plant-wide program point up the advantages to be gained with the Nalco System in plants new or old.

See the next page for details on Nalco results on Ammonia Road

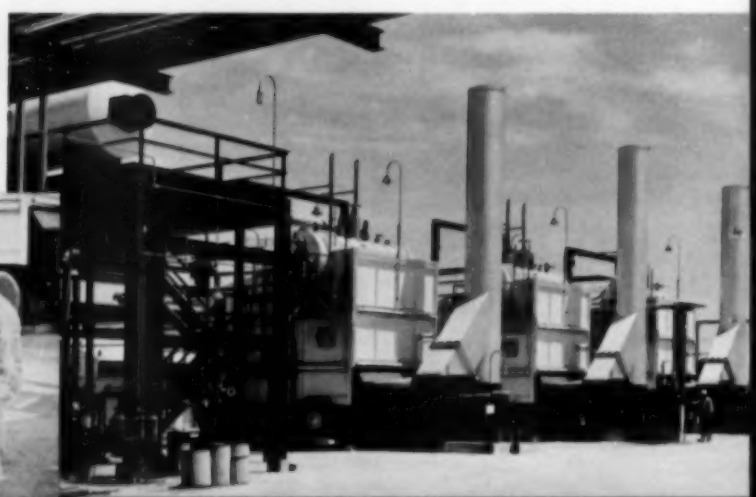


Top—Large cooling tower at this new west coast ammonia plant gets protection against scaling and corrosion with a non-toxic Nalco formula. Low pH treatment stops deterioration of cooling tower lumber and cuts dosage requirements for slime and algae control.

Above—Ball form cooling water treatment is merely dropped into a simple wire basket device suspended in cooling tower basin.

Nalco System treatments on Ammonia Road solve these important water and steam processing problems: scale and corrosion prevention in both water and steam systems; boiler-water foam control and sludge-conditioning; and contamination-free process steam.

Whatever your water treatment problems may be—in a plant of any size—there is a Nalco System program designed to solve them, permanently . . . and economically. Write or phone today for details.

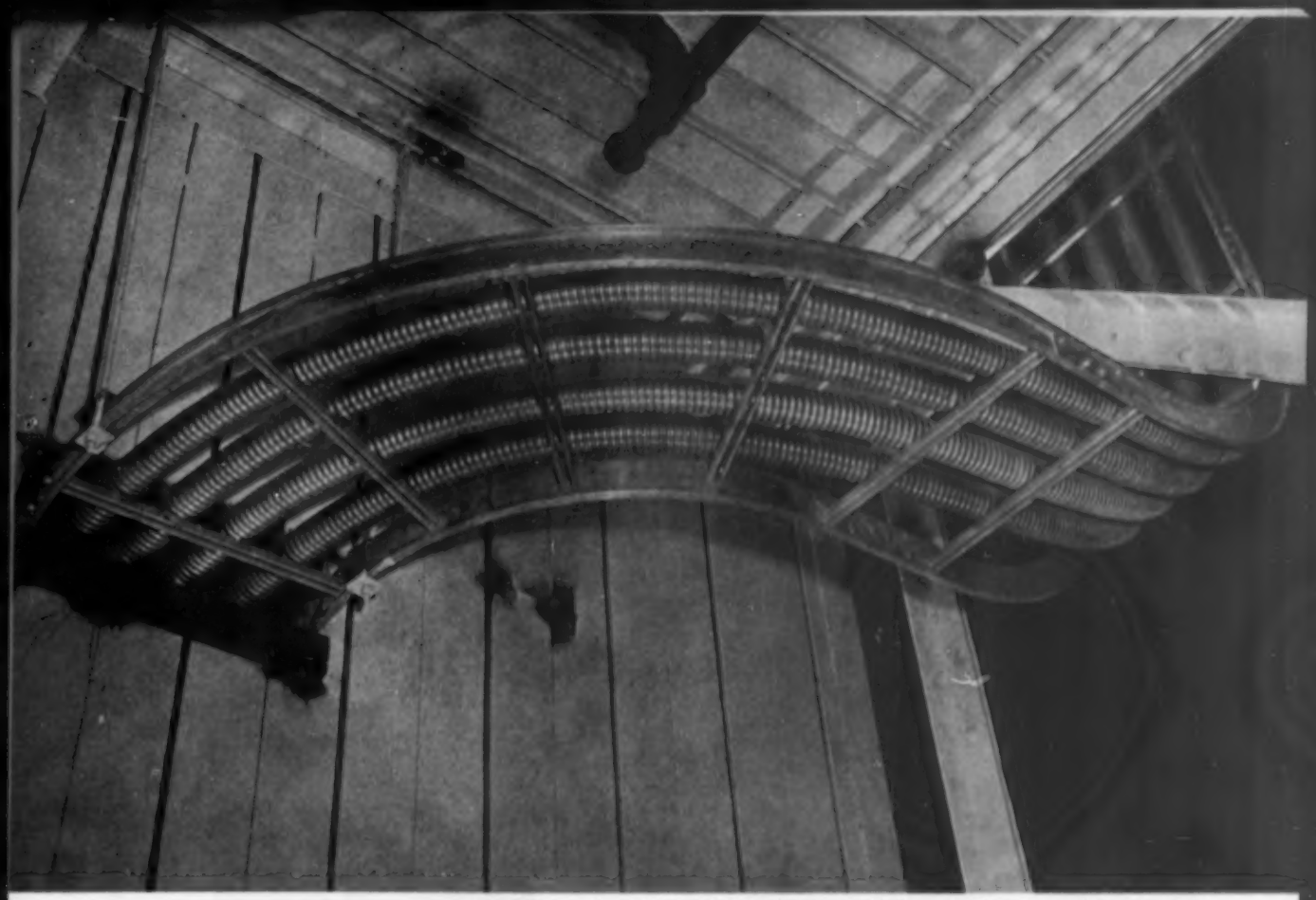


Above—These steam generators on outdoor settings provide super-pure steam for ammonia processing and heating. Nalco chemicals in ball-briquet form are put into by-pass feeders (left) to insure trouble-free water treatment on Ammonia Road.

NATIONAL ALUMINATE CORPORATION
Phone: POrtsmouth 7-7240
6216 West 66th Place
Chicago 38, Illinois

In Canada, Alchem Limited
Burlington, Ontario

THE Nalco® SYSTEM . . . Serving Industry through Practical Applied Science



ANACONDA INTERLOCKED-ARMOR Cable is installed on simple racks and eliminates the need for conduit. Installation work is finished often in half the time required for other cables.

Instead of installing cable plus conduit...

Cut installation time and cost with cable with its own inbuilt flexible conduit!

When you expand or relocate your power feeders, Anaconda Interlocked-Armor Cable puts you into *full* operation days—sometimes weeks—sooner.

Because it is made with its own tough yet flexible armor, Interlocked-Armor Cable is installed without conduit. Installation time and costs are slashed.

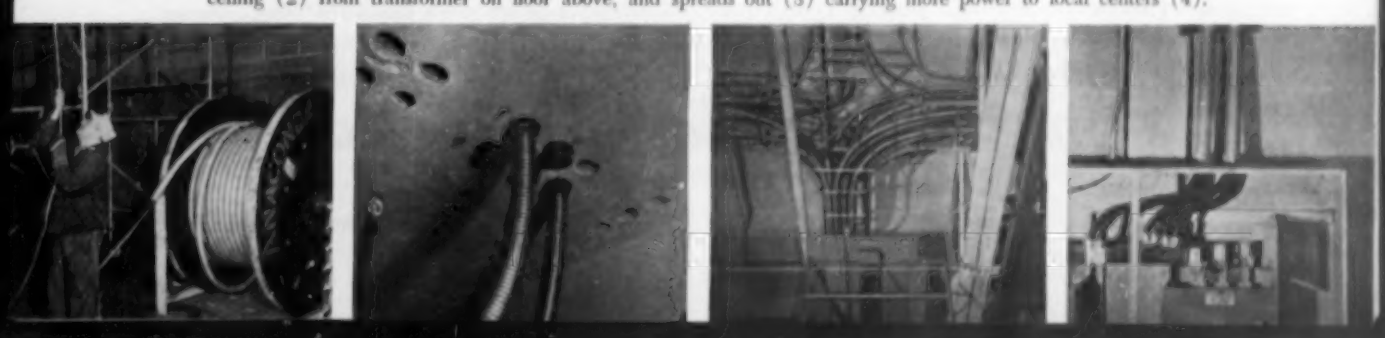
It is laid quickly—indoors or out—on light, easily installed racks. It is trained smoothly around corners, columns and other obstructions in *long, uninterrupted* runs. And this cable's metal tape armor affords high protection against damage.

Available in multiconductor construction in sizes No. 6 Awg to 750 Mcm—varnished-cambric insulation up to 15 kv—Underwriters' approval for 600 volts and 5000 volts. Also available with rubber or plastic types of insulations.

Why not talk to the Man from Anaconda about modern, practical Interlocked Armor Cable today? Or, for information, write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

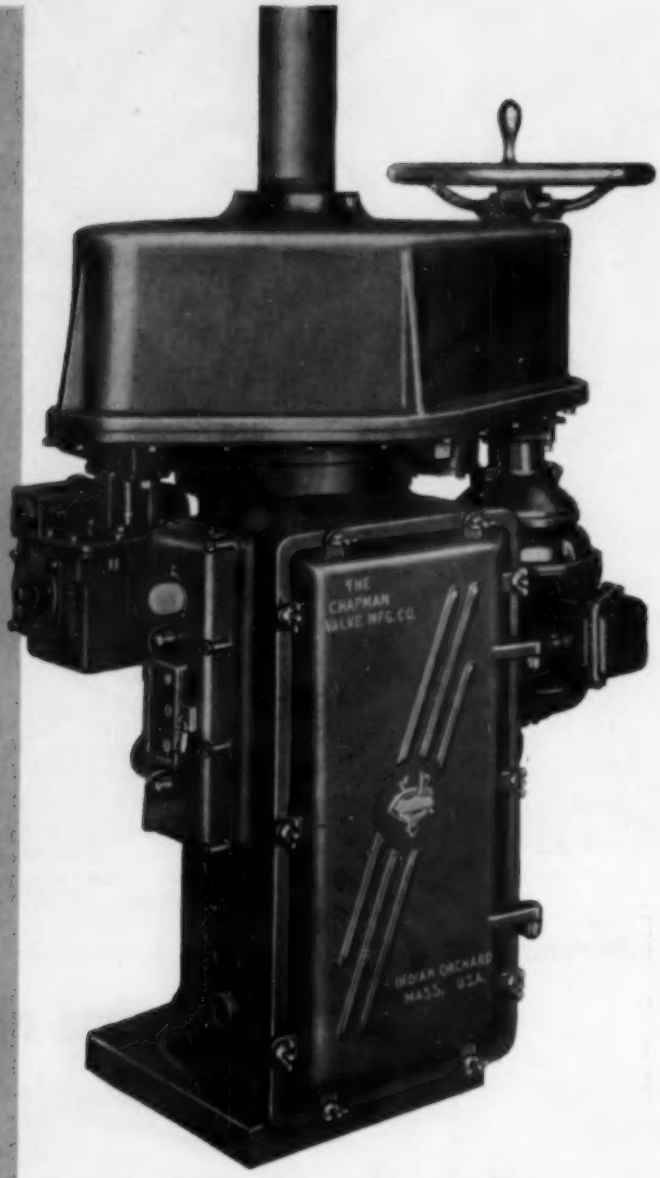
ANACONDA®

METALWORKING PLANT expands its power system with Anaconda Interlocked Armor Cable (1). Cable drops from ceiling (2) from transformer on floor above, and spreads out (3) carrying more power to local centers (4).



Fewer Parts Mean Greater Dependability

Floorstand Motor Unit . . . control panel, motor, limit switch and push button station.



Simple, durable mechanism of Chapman's Motor Unit. Handwheel remains stationary during motor operation.

IN CHAPMAN MOTOR UNITS

Chapman's simple and rugged Motor Unit gives accurate, trouble-free control of large valves and sluice gates. It has approximately *half as many parts* as any other unit. Its simplified design, low speed motors and low-ratio, stubtooth gears combine to give positive operation without drift, in *any* position and under all conditions.

Installation is fast and simple. The floorstand unit comes completely wired, ready to connect to leads. Limit switch has micrometer adjustment for exact pre-setting for seating tightness. Motor Units operate smoothly under the most adverse conditions. All units are weather-proof and steam-tight. Write today for *new* Catalog 51.

The Chapman Valve Manufacturing Co.

INDIAN ORCHARD, MASSACHUSETTS

TIMELY COMMENTS

High Costs Promote Automation

THE FACT that high labor costs encourage the use of automatic regulators and controls is well understood, but it is not so commonly realized that high cost of production equipment also forces management to purchase more automatic equipment.

The limit toward which the automatic production trend may go is the "completely automatic plant." The cost of complete automation, however, would be enormous, and this kind of money will not be spent until costs are a great deal higher than at present.

Right now, most efforts toward automation are confined primarily to labor savings, product improvement and reduction of rejects. But even now vigorous efforts are also being made to keep each machine operating continuously at maximum capacity.

As equipment costs continue to rise (and they will rise with labor costs), more and more capital will be expended on mechanical means for "keeping the throttle wide open." Those plants with manually controlled, irregularly loaded production units will begin to find their return on investment is less than for those plants that have acknowledged the charms of automation.

. . . at full capacity

The reasons why expensive production equipment demand automatic controls are obvious, and there is nothing new about the principles involved. Every time an expensive production unit like a paper machine stops, or produces at less than full capacity, high investment charges go right on—and the owner is getting less product than his investment warrants. After spending millions for a paper machine, the few thousands of dollars needed to provide instrumentation and controls to keep it at full capacity are cheerfully invested.

As a consequence of automation more goods are being made at lower unit cost, and most economists agree total employment will not diminish because of mechanical improvements. There will, however, be a change in the nature of jobs performed. Operators of the new plants will need more intelligence, more skill, and more training. Already extensive application of materials handling equipment has made the "strong back" job almost a thing of the past in modern industrial plants.

You Must Do Your Own Voting

EDITORS of a general industrial magazine such as SPI are frequently sorely tempted to dismount their chargers and lance out at beasts on the side of the trail rather than continuously attack their avowed objective which is straight ahead.

Our objective (the reason you subscribe) is to present factual data and case studies that will help engineers, maintenance supervisors and production managers solve their technical and mechanical problems. The job is a big one (too big to do perfectly) and, therefore, we must refrain from giving any great portion of our space and energies to problems that fall more properly in the business rather than the plant field. We refer to such problems as taxes, politics, government competition, distribution and transportation of goods, etc. Interested in these problems as we are, and fully recognizing their importance to the plants we serve, temptation to take part in such controversial issues is great. But to a large extent we must refrain from diverting our efforts from our chosen field of coverage.

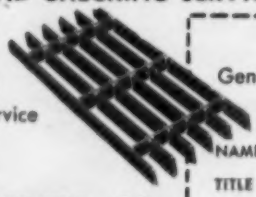
We do take part in such issues personally through associations, through correspondence, and by "having our say" verbally whenever opportunity presents itself. But if we were to cover these items competently in the magazine, SPI, as it has been known to southern plant men for 50 years, would cease to exist. No space would be left to deliver the plant service we have promised you.

So! if you wonder, as your letters sometimes indicate, why we do not jump off our horse and charge these threats to progress—you have our explanation in the above paragraphs. We simply cannot give battle to all these foes and still give the industrial and power plant information you have a right to expect. Discussion of national, political, and economic problems must be left largely to newspapers and those magazines that serve the individual rather than the plant. And solutions to these same problems must come from your continuous wise action at the polls.

Q. How can I avoid costly field corrections when installing floor grating?

A. SPECIFY BORDEN and receive a completely custom fabricated floor grating including cut-outs, toe plates, fasteners and stair nosings. Be sure with BORDEN'S FREE PLANNING AND CHECKING SERVICE.

Write for complete information on BORDEN'S free planning and checking service in this FREE booklet



BORDEN METAL PRODUCTS CO.

853 GREEN LANE Elizabeth 2-6410 ELIZABETH, N. J.
SOUTHERN PLANT—LEEDS, ALA. — MAIN PLANT—UNION, N. J.

BORDEN METAL PRODUCTS CO.

Gentlemen:

Please send me BORDEN Catalog #AT254.

NAME .....

TITLE .....

COMPANY NAME .....

ST. AND NO. .....

CITY AND STATE .....

INDUSTRY SPEAKS

SOUTHERN POWER AND INDUSTRY

Large Non-Military Dividends

Adapted from comments by **Lewis L. Strauss,** Chairman, **U. S. Atomic Energy Commission** for the recent launching of Submarine "Sea Wolf" at Groton, Conn.

THE launching of the Sea Wolf marks another important achievement in the development of atomic power. It signifies—as did her proud predecessor, the Nautilus—the leadership and determination of American democracy and free enterprise to advance the day when atomic power will greatly enrich our lives and the lives of peoples everywhere.

Work on the power plants for the Sea Wolf and Nautilus was started at about the same time as parallel and competitive efforts, using reactor designs of marked difference. The Nautilus uses a reactor operation with low velocity neutrons, and the heat is removed by water under high pressure. On the other hand, the Sea Wolf reactor operates with neutrons of higher velocities and liquid metal is the medium of heat transfer.

In the beginning no one could be certain of the success of either attempt, since atomic power was then still unproven; it was a great and very bold venture.

I need not tell you how handsomely the Nautilus performed at sea under all conditions.

Today, I am happy to be able to announce that the land-based prototype of the atomic power plant which will be used in this great new submarine also has operated most impressively.

Beginning on June 6th, that prototype, located at West Milton, N. Y., operated at full power, long enough to have propelled the Sea Wolf on a 2,250 mile, non-stop trip, fully submerged. That represents the equivalent of an undersea voyage from St. Johns, Newfoundland, to Dover, England. This, I am told, compares to four hours at full power as the qualifying time for new, diesel-powered submarines.

This prototype of the Sea Wolf power plant has achieved further renown. At West Milton, I had the privilege of throwing the switch which sent thousands of kilowatts of power surging into transmission lines to serve homes, farms and industries of upper New York state.

In a little more than five years, we have established the success of two different types of atomic energy reactors as propulsion systems for submarines, and this achievement was due neither to accident nor good luck. It is the result of hard work on the part of many skilled, devoted and courageous people.

Outstanding among those entitled to take deep personal pride in this event is my friend and colleague, Admiral H. G. Rickover.

The Electric Boat Division of General Dynamics Corporation and the General Electric Company merit particular commendation and we in the Commission are continuously grateful for the splendid cooperation we have received in this, as well as many other enterprises, from our great Navy, and especially its distinguished Secretary, the Honorable Charles S. Thomas.

We build submarines and other weapons of defense because we have no other prudent alternative. Our security and our freedom depends upon them.

Nevertheless, such military weapons as the Nautilus and the Sea Wolf return to us **very large, non-military dividends**—dividends which may, in fact, exceed the cost.

For the atomic power plants so developed provide us with valuable new knowledge with which to advance the peaceful applications of atomic energy, especially in the field of power.

The Old Shoe is Pinching

THE National Society of Professional Engineers has called upon a Senate Subcommittee to eliminate language in a pending TVA financing measure which would permit TVA to provide engineering services to non-TVA groups.

The measure, introduced by Senator Kerr of Oklahoma, is being considered by the Senate Public Works Subcommittee on Flood Control and would authorize TVA to issue bonds to assist in financing its power program.

The engineering society stated that a section of the bill would permit TVA to furnish engineering and construction services to outside agencies or organizations if they were to build and operate power facilities or any other facilities with a tie-in to TVA operations.

In a statement to the Committee, Allison C. Neff, president of the engineering society, said that such action would be "unwarranted interference with the normal functions and operations of private consulting engineers who have been and are available for such normal professional activities."

Neff said that the federal government should not compete with its own citizens in furnishing materials or services to non-federal agencies or persons, particularly with respect to the independent practice of the professions.

The National Plastic Products Company, Odenton, Maryland, has flexible, modern system . . .

High Voltage POWER DISTRIBUTION

By DAVID GOLDSTEIN, Electrical Engineer
The National Plastic Products Company, Odenton, Maryland

THE National Plastic Products Company is located adjacent to the Consolidated Gas and Electric Light and Power Company's 110,000 volt sub-station which is approximately 12 miles south of Baltimore City.

National manufactures diverse products such as saran filaments, Nevamar decorative laminates, Wynene injection molded parts and various extruded items for the armed forces.

Power Requirements

Power is used 24 hours a day, seven days a week. Originally, low tension service was purchased at 240 volts 3 phase and 120/240 volts single phase.

As the plant began to expand, it was realized that it would be impractical to continue to spread the use of this low voltage. Consequently, power was purchased at 13,200 volts through alternate feeders but without any automatic throw-over switch.

After converting parts of the old plant to 480 volts, in order to give relief to the overloaded 240 volt bank of transformers, all subsequent unit substations were connected for 480/277 volts. In some areas dry type transformers are used for lighting with three phase 120/208 volts.

Open type wiring was originally used for the 13,200 volt distribution and only a short section of 1000 ft remains while the rest has been replaced by shielded pre-assembled "Kerite" aerial cable which was installed by our own groups on eight-inch steel columns projected through the roofs of the various buildings, thus keeping the roadways clear and the cables very high in the air.

Distribution Data

Power is distributed at the high voltage through 5 General Electric substations located at convenient centers. At the load centers voltage is transformed to 240 volts 3 phase at one substation and the rest to 480 volts delta and 480/277 volts wye, the latter to serve both power and lighting loads as well as infra-red drying ovens. Special pains were taken to obtain almost zero ground resistance by driving groups of sectional ground rods, 30 ft each, in the ground, and eight separate grounds were connected in parallel for each substation before any concrete floors were poured.

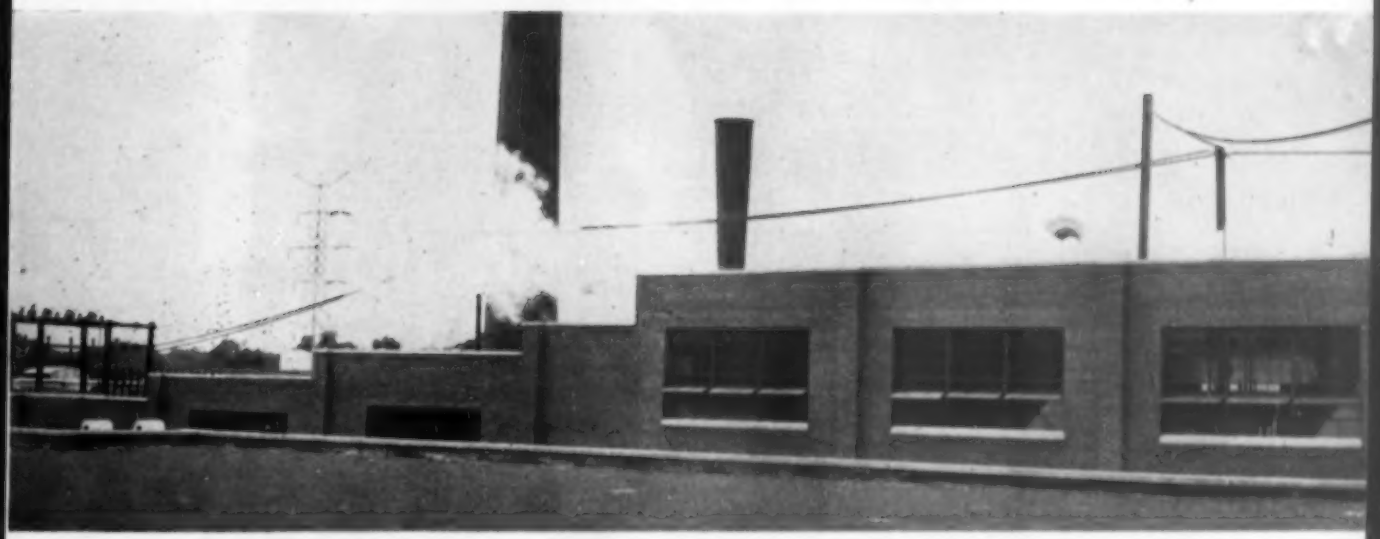
"The choice of 480 volts has certainly resulted in lower installational costs and added greatly to the flexibility which is required by the constant shifting of load requirements brought on by changes in the plastics art."

Although no credit is allowed for power factor in excess of 75% by the local utility, occasions developed in which the heating of switches, feeders and transformers were relieved by the use of blocks of capacitors at the proper points. In addition, one 125 hp synchronous motor on an air compressor makes a helpful contribution to these conditions. Voltage drop throughout the plant is negligible, because the runs are not too long.

Every attempt is made to keep the voltage just under 480 volts, preferably 475 volts. This is done so as to keep 440 volt motors from operating higher than the 10% margin allowed in motor design. Voltage regulators are not used anywhere in the plant due to the proximity of the utilities 110,000 volt substation.

The choice of 480 volts has certainly resulted in lower installational costs and added greatly to the flexibility which is required by the constant shifting of load requirements brought on by changes in the plastics art.

Service enters the plant through a manually operated main oil breaker with overload trips. Power is distributed to 5 substations through electrically operated oil breakers equipped for a-c tripping



AERIAL CABLE as it leaves the switchgear. Cable in foreground feeds substation No. 3 located in the penthouse on the roof, from where this photo was taken. The other cable feeds Substation No. 4.

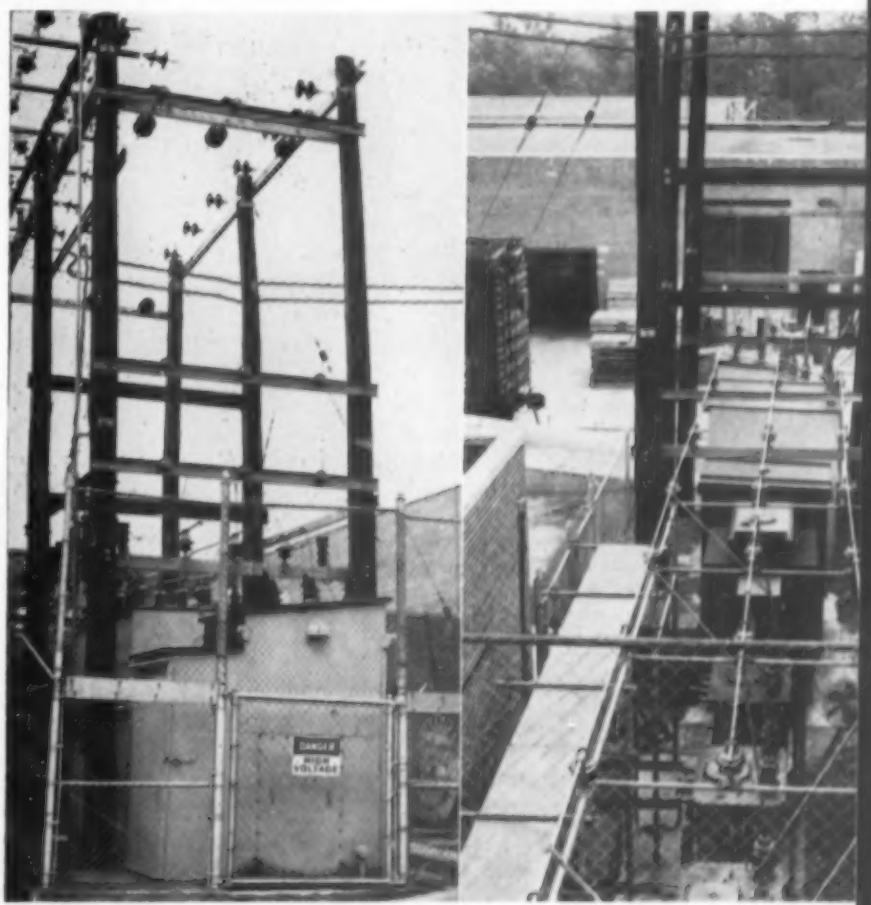
and d-c closing from a remote point. Emergency power for operation of the breakers is available from a separate utility service on their 4160 volt feeder.

All load centers are connected not only from one unit to another but underground conduits are arranged so that assistance can be obtained from one or more units dependent upon where capacity is required and what is available.

Each substation is equipped with an ammeter, voltmeter and watthour meter with 15 minute demand registers so as to observe daily peak loads and power factor.

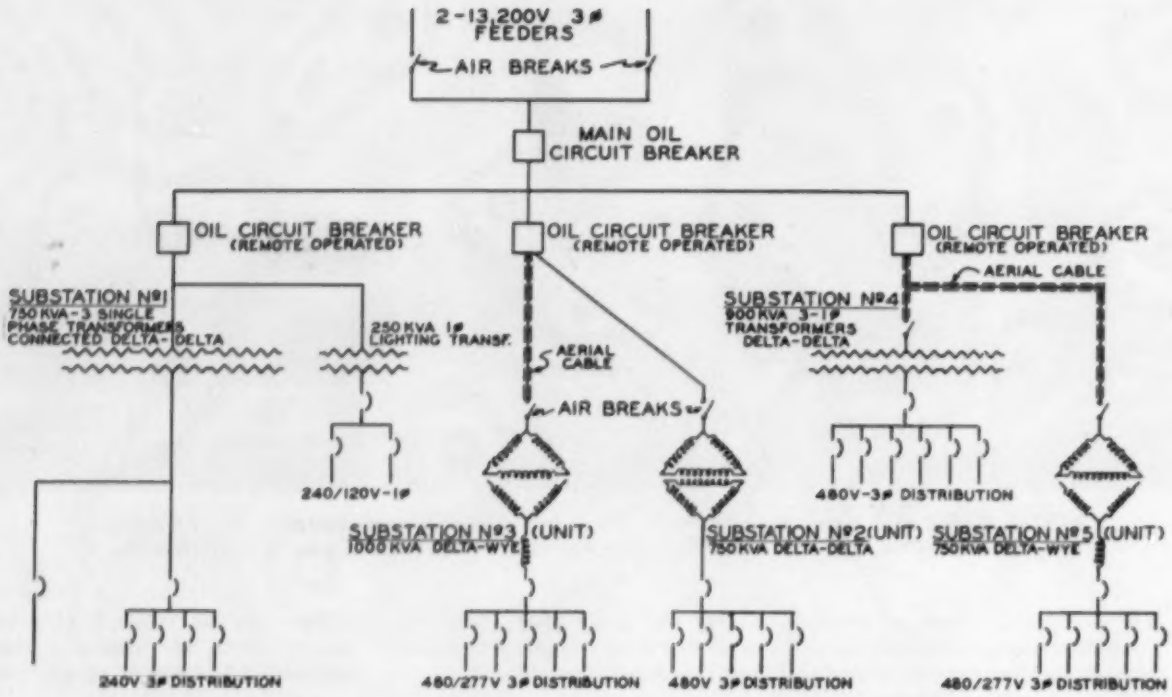
One hp, three phase fans are used whenever necessary for cooling the transformers.

Two 140 kw vertical infra-red coating ovens are connected with two sets of 500,000 cm wire at 240



LEFT—Entering 13,200 volt service comes into the main oil circuit breaker. Substation No. 2 is directly behind the switchgear. The aerial cable is shown leaving the oil circuit breaker enclosure.

RIGHT—Opposite view of photo at left shows two of the three single-phase transformers of substation No. 1 in foreground. 250 kva lighting transformer and Substation 2 are shown in the background.



POWER DISTRIBUTION SYSTEM DIAGRAM — THE NATIONAL PLASTIC PRODUCTS COMPANY

volts three phase. Two lamps in series with standard bases are connected across each phase. Should the necessity arise for increased production, it is planned to install a large neutral conductor to this area, reconnect the 240 volt delta bank to three phase four wire wye bank of 414/240 volts and operate two additional coaters over these same feeders.

The control for these ovens is through two 25,000 ampere interrupting capacity electrically operated 600 ampere air circuit breakers with 300 ampere trip coils. This arrangement minimizes maintenance of contacts where jogging of the load is done to change position of the paper feed.

At another part of the plant where drying is done with 60 kilowatts of infra-red lamps which are connected two in series across the neutral and each phase of the 480/277 volts available at this point. The taps of this transformer were moved so that the voltage across phases is normally 475 volts and surprisingly enough the burn outs of the two lamps in series on this voltage have been negligible. Lighting in most of the plant is across 120 volts. Lighting in the offices and work areas are equipped with four foot fluorescent fixtures and storage areas are lighted with incandescents.

Typical unit installation of substation No. 3. The 4" conduit carries the incoming aerial cable. The smaller 1¼" conduits carry the 2/0 equipment ground.

Penthouse Installation

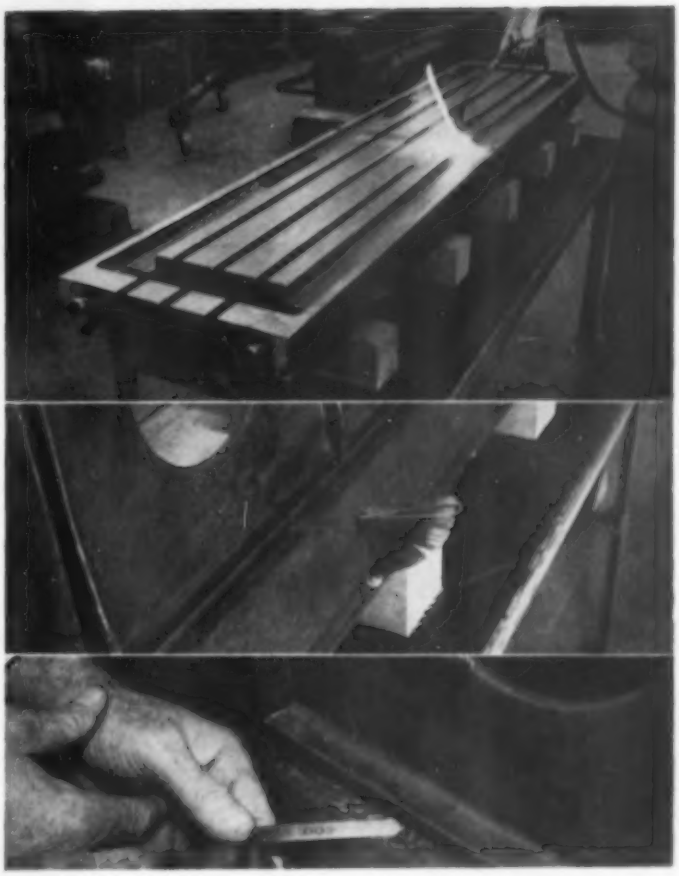
One 1000 kva unit substation is located in a penthouse atop a building with heavy electrical requirements. The room for the substation was large enough to house the air conditioning equipment for the new electrically equipped cafeteria.

One of the features of the penthouse installation is the 6 ft x 6 ft x 6 ft pull box directly under the secondary circuit breakers and in the ceiling of the molding department permitting direct connection to the six inch trough around the perimeter of this area and the use of one 225 ampere air circuit breaker tapped below the duct and serving each two machines from one breaker.

The 13,200 volt primary to this substation is fed with the aerial cable and is arranged for continuing the aerial cable from this substation by the looping method.

Heat-Straightening Milling Machine Tables

By F. C. CLAYTON
Chief Plant Engineer
Convair, Fort Worth, Texas



FOR the past year Convair at Fort Worth has been engaged in a large scale machine tool overhaul program. New high performance military aircraft require more and more close tolerance machined parts and tools, and machine tools must be maintained to hold original or better tolerances. Many of the machines being overhauled are 12 and 13 years old and due to long hours of hard use during the war, have exceeded a normal service life.

Of particular importance in the overhaul program are milling machines. In most cases these are being completely rebuilt, and it has often been possible to better original tolerances.

The most troublesome problem has been truing the tables. This is particularly true on the larger mills equipped with long tables which considerably overhang the knee. Over the long period of operation, these tables have acquired a "set," drooping at the ends. This becomes quite apparent if the table is inverted and the ways are checked with a precision straight edge.

The normal method of truing milling machine tables is to first scrape the ways true, then set the table up on a planer or surface grinder and true the top. This method is fine where warpage is only a few thousandths. In many cases, however, the bow in the tables discussed here was from .005 in. to .035 in. or even more. Under such conditions cost and time for hand scraping become prohibitive, and re-machining or grinding both ways and top are also very expensive.

Faced with this problem, one of our machine overhaul mechanics suggested, through our Employees Suggestion System, a method of heat-straightening milling machine tables which has proven highly successful.

The method used consists of heating localized cross sections of the table from the top side, starting at the center as shown in the top photograph. Upon cooling, the top shrinks, taking out some of the bow. One heat is sufficient for tables with a bow of only .002 in. to .004 in. On tables bowed .005 in. to .018 in., two additional heats are applied approximately 12 in. each side of the center. On tables warped in excess of .035 in., heat is applied in six additional positions. For intermediate warpage, proportional heats are applied. The amount of heat applied at one time is a matter of judgment, and must be determined empirically.

The center and bottom photographs show a table "before and after," being checked in inverted position against a precision straightedge. Original deflection of .035 in. has been reduced to less than .002 in. Final truing by hand scraping then becomes a relatively minor job.

During the past year, fifty milling machine tables have been straightened by this process with an estimated saving of $8,750.00.

Texas Electric Service Company's First Outdoor Steam Plant

Eagle Mountain Station

Air conditioned control room provides view of operating deck, and mimic piping and wiring show principal flow. Teflon insulated heating cable is installed under pipe insulation to prevent freezing.

By H. P. HOOPER
Engineering Department
Texas Electric Service Company
Fort Worth, Texas

THE FIRST unit at Texas Electric Service Company's Eagle Mountain Plant was placed in service in the Fall of 1954. The station is located fifteen miles northwest of Fort Worth on Eagle Mountain Lake and is designed for an ultimate of four units. Construction for the second unit has just begun and is scheduled to be completed early in 1957.

Building and Foundations

The plant is a complete outdoor installation, there being no enclosures except the control room and the adjacent rooms housing station battery, charger, air conditioning and miscellaneous equipment.

The turbine pedestal height is 18 ft and a concrete deck at the same height between turbine pedestal and boiler supports auxiliary equipment such as boiler feed pumps, extraction heaters, evaporator, auxiliary switchgear, and forced draft fans, which provides a single level for convenience of operation. Most of the piping and electrical conduits are carried under the deck with a minimum of underground runs for these services. A 50-ton gantry crane rolls on rails at turbine pedestal level.

There is a one-story brick building which houses the plant office, storeroom, electrical shop, laboratory, machine shop, a small assembly room and locker rooms.

The water treating system for domestic and makeup services has a small brick building housing chemical feeders and providing a storage space for necessary chemicals. The water treating reactor, clear well, pumps and some other accessory equipment are outdoors.

Turbine—Generator

The turbine generator unit is rated at 110,000 kw, 3600 rpm, and is a tandem compound unit. The throttle steam conditions are 1250 psig and 950 F. There are six extraction points of which five are in use, the top being blanked off.

The generator is rated at 144,118 kva at 30 psig hydrogen, 15,500 volts, three phase, 60 cycles. The

unit has a geared exciter rated 350 kw at 375 volts operating at 1191 rpm.

The turbine exhausts to a twin shell, 75,000 sq ft condenser, the shells being located along side the pedestal at yard grade elevation. The condenser is of the deaerating type and gases are removed by steam jet ejectors located on the operating deck.

Water Supply

Condensing water is taken from Eagle Mountain Lake at an intake structure located approximately 1500 ft from the condenser by two circulating water pumps located at the intake structure and is delivered to the plant through an 84 in. reinforced concrete pressure line which was tunnelled through a hill for a distance of approximately 1200 ft.

The circulating pumps discharge to a common header through motor operated butterfly valves which are interlocked with the motor circuit breakers and are operable from the main control room.

Two traveling screens are provided, one in each pump chamber, with trash rack and five fixed screens. The traveling screens are operated periodically and a differential level alarm is installed to operate the annunciator in the control room in event of excessive clogging of screens.

Circulating water is returned to the lake through a discharge structure and seal well nearby. A point of land between intake and discharge provides a considerable distance of travel to prevent recirculation of warm water.

Two service water pumps are located at the intake structure. The service and circulating water lines are adequate in size for two generating units. The condenser circulating water is furnished by two vertical mixed flow pumps rated at 32,500 gpm each with suction sufficiently deep to operate with water 25 ft below lake spillway elevation.

Chlorine is intermittently injected into the condenser circulating water system and continuously into the service water system for slime and algae control. A hypochlorinator is provided for the domestic water system servicing the plant and the operator's village nearby.

Steam Generator

The steam generator is a Babcock and Wilcox radiant boiler with pressurized furnace. It is rated at 1,050,000 lb/hr continuous and has an eight hour rating of 1,100,000 lb/hr.

Normal fuel is natural gas with oil stand-by. The unit is elevated for possible future conversion to solid fuel. There are eighteen Forney Engineering Company combination gas and wide range mechanical atomizing oil burners of the center fired type.

The burners are equipped with remote controls for gas operation. These controls permit lighting or

View of operating deck showing control room in left background.

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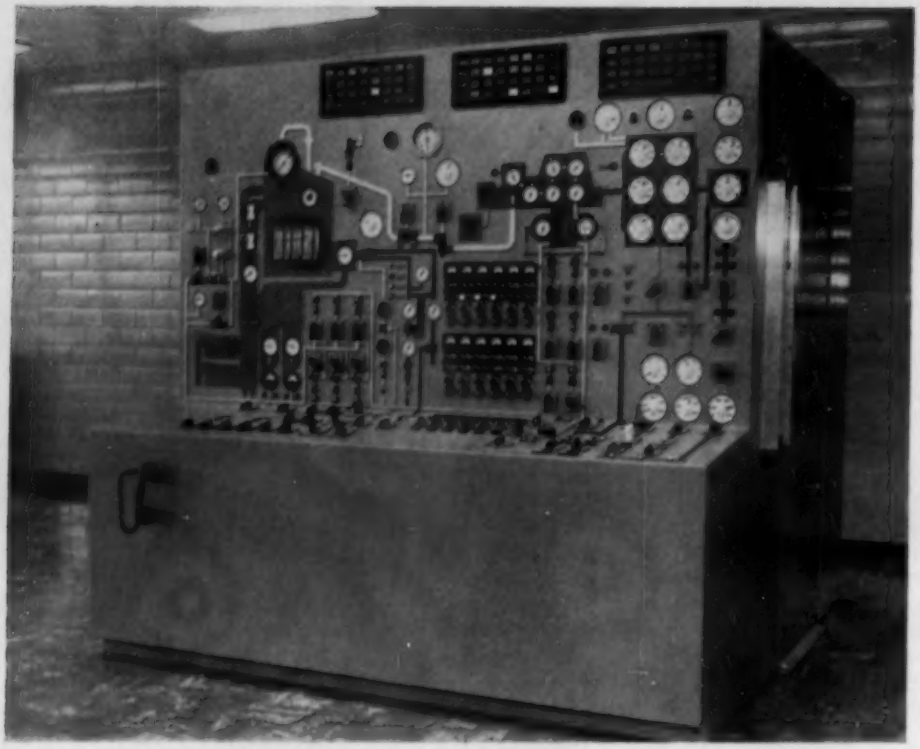


Boiler—turbine—generator control board. Group of controls in center is for remote burner operation.

shutting down each burner from the firing aisle platform or from the control room by a single control switch. This operation controls the burner gas cocks and air registers through a sequential programming control and provides complete protection by electronic devices and interlocks against failure of pilot light or main burner during the starting cycle.

Two electrical drive units are provided at each burner, one operates the gas cock, the other the air register. After completion of the starting cycle, the air registers can be adjusted from the main control board. The register position is continuously indicated on a voltmeter type instrument. Provision is made for future soot blowers and dust collectors, but they are not needed for gas burning.

A reinforced concrete brick lined stack 225 ft high serves the existing unit and is adequate for one additional unit.

There are two forced draft fans located at operating deck level supplying air through a tubular preheater. The fans are equipped with inlet boxes and louvers and hot air recirculation is used to minimize cold and corrosion in the air heater. A gas recirculating fan located slightly below operating deck level is used for superheat temperature control at low load operation.

Diamond Bi-Color water gauges are provided with one vision duct carried to operating deck level, and water level indication is transmitted pneumatically to the main control board in the control room.

Feedwater Supply

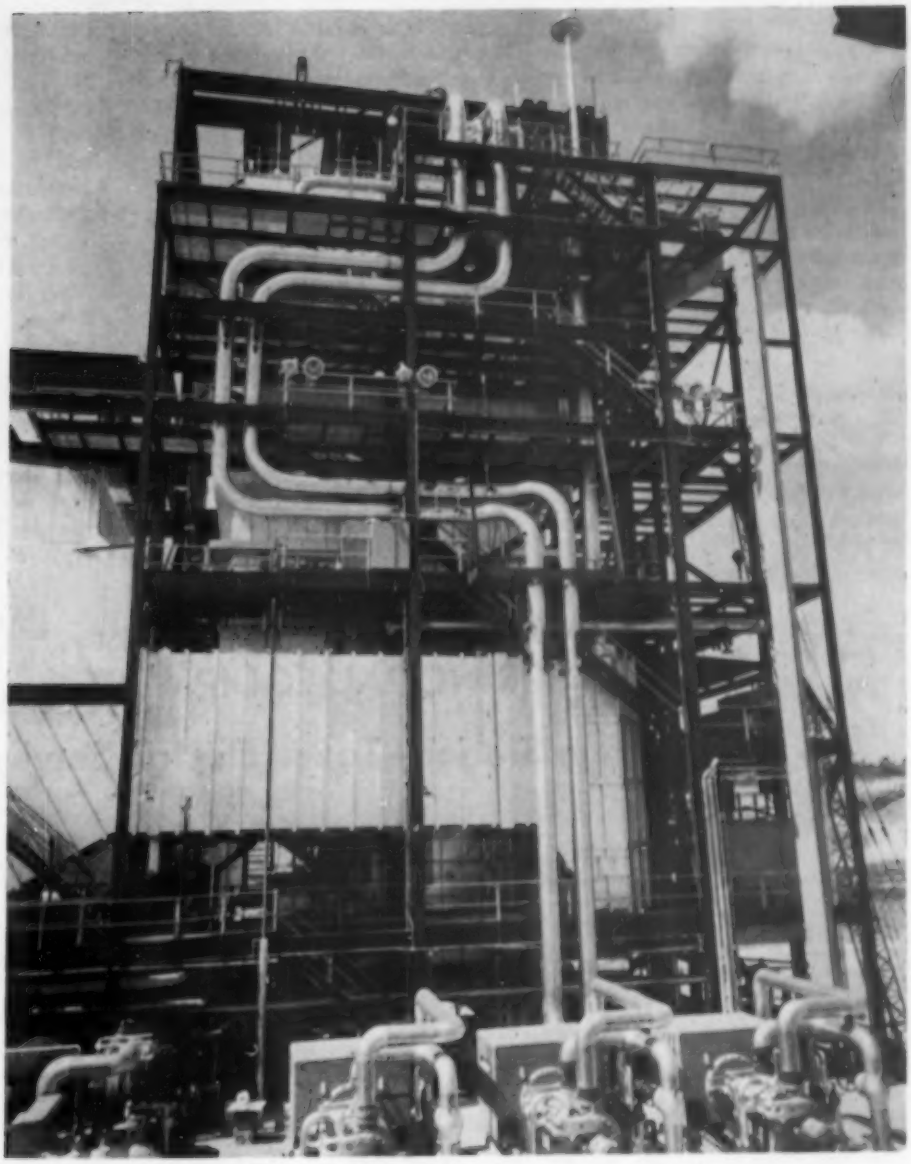
There are three half capacity vertical condensate pumps which deliver condensate from the condenser hotwell through three low pressure closed heaters into the suction header of three half capacity boiler feed pumps. The boiler feed pumps and condensate pumps are interlocked electrically in pairs so that, in the event of failure of a condensate pump, the paired boiler feed pump will automatically shut down and the reserve condensate-boiler feed pump pair will start.

There are two high pressure heaters, and feed water regulation is by a three element Republic pneumatic system. All of the extraction heaters are of the horizontal type, all except one being equipped with integral drain coolers and all located on the operating deck except the low pressure heater which is below the turbine pedestal.

Drains from the high pressure heaters cascade to the intermediate pressure heater, from which point drainage is pumped into the boiler feed suction. Drains from the low pressure heaters cascade to the condenser. All drain controls and valves are by Fisher Governor Company.

Sodium sulfite is continuously fed into the condensate system for oxygen scavenging, and sodium phosphate is fed into the boiler drum. All chemical feed is by variable stroke pump.

The 30,000 lb/hr reboiler type evaporator is equipped with a deaerating preheater and is fed sodium zeolite softened water. Evaporator vapor is condensed in



Steam generating unit.

Three boiler feed pumps are in lower foreground.

one of the stage heaters with a by-pass to the condenser.

Control Room

The air conditioned control room is located on the operating deck and has large windows providing a view of the turbine pedestal, operating deck and a portion of the boiler. The control room includes the combined boiler-turbine-generator control board, the d-c control board, and transmission line control panels. Sufficient space is provided for controls for two units and it is planned to extend the room for controls for Units No. 3 and 4.

The boiler - turbine - generator control board is of the miniature graphic type and is a tunnel type board 8 ft in length with attached benchboard. Boiler, turbine, and principal auxiliaries are shown by emblems on the front of the board with gauges and instruments mounted in and adjacent to the emblems.

Mimic piping and wiring show the principal flow and wiring diagrams, and control switches and indicating lights are mounted in the mimic piping and wiring lines. Pressures and temperatures are transmitted pneumatically and electronically and there are no high pressure lines in the control room. Principal recorders are located on the back of the board.

Individual remote controls for the gas burners with indicating lights showing indication of valves and air register indicators for individual gas burners are located on the front of the control board.

Electrical Equipment

The generator buses are copper tubing covered with micarta tubing and are enclosed in the vicinity of the generator to afford mechanical protection. They extend to the main transformer structure which is located nearby where they

connect into two 56/70 MVA OA/FA transformers where the voltage is stepped up to 132 kv.

The output is then carried overhead to the 132 kv switchyard where it feeds into the system through three 132 kv transmission lines.

Station service requirements are provided at 2400 volts for larger motors and 480 volts for smaller motors. A 480 to 120/208V step down is provided for station lighting.

The motors are all outdoor, weatherproofed type and are provided with power house insulation. Most of the motors are equipped with electrical space heaters to protect against moisture when out of service.

Provision is made for circulation of heated water through the generator hydrogen coolers to prevent deterioration of generator insulation in the event the unit is shut down for extended periods during cold weather.

Freeze Protection

Freeze protection is by teflon insulated heating cable applied under the insulation of pipes which are subject to freezing. These freeze protection circuits are fed from special panels equipped with indicating lights to monitor the operation of the individual circuits.

Future Unit

The arrangement of Unit No. 2, which is scheduled for trial operation early in 1957, will be generally similar to that of Unit No. 1. Unit No. 2 will be a 156,250 kw tandem compound, 1800 psig, 1000 F, 1000 F reheat and steam will be supplied by Riley steam generating unit.

Combustion control will be designed for wide range operation which will extend from unit auxiliary load to full load operation. Remote burner controls will be used and complete loss of unit load will be followed by automatic removal of predetermined number of burners from operation. The high pressure extraction heaters will have the tubes welded into the tube sheets in order to minimize the leakage at the higher feed pressure.

PRINCIPAL EQUIPMENT

Eagle Mountain Station—Texas Electric Service Company

GENERAL DATA

Name of Station .....Eagle Mountain Steam Electric Station
Station Site .....15 miles NW of Fort Worth, Texas
Total Generating Capacity ...115,000 kw
Total Boiler Capacity .....1,100,000 lb/hr
Steam Conditions .....1250 lb/sq in.
Cooling Water Source .....Eagle Mountain Lake
Design Engineers .....Ebasco Services, Inc.
Construction Work .....Friedman Construction Company

TURBINE-GENERATOR

Turbine .....1—G.E. Co., 3600 rpm, 110,000 kw, 1250 lb, 950 F
Generator .....1—G.E. Co., 122,000 kva, 15,000 v, 3-phase, direct connected
Main Exciter .....1—G.E. Co., 375 v, 350 kw, 1191 rpm, geared to generator shaft
Generator Coolers .....4—G.E. Co., Type SF, 11,750 sq ft cooling surface, 1,000 gpm cooling water
Turbine Oil Coolers .....2—Schutte and Koerting, U Tube, 1020 sq ft
Turbine Oil Filter .....1—DeLaval, 500 gph

CONDENSING EQUIPMENT

Condenser .....1—Lummus Co., surface type, twin shell, deaerating, 75,000 sq ft cooling surface
Circulating Pumps .....2—Ingersoll - Rand, vertical, 32,500 gpm each, 700 hp motor
Condensate Pumps ..... 3—Ingersoll - Rand, vertical, 1,350 gpm, 300 hp motor
Air Removal Equipment .....Lummus Co., Steam jet
Priming Ejectors .....2—Lummus Co., Steam jet, 19,400 and 3,100 cfm
Expansion Joints .....U. S. Rubber Co.

SWITCHBOARD EQUIPMENT

Panels .....L & N—Panellit Inc., Main BGT board, and 6 relay and control panels
Instruments and Relays .....G.E. Co.
Load Indicator .....Leeds & Northrup
Voltage Regulator .....G.E. Co., GFA-4

STEAM GENERATING EQUIPMENT

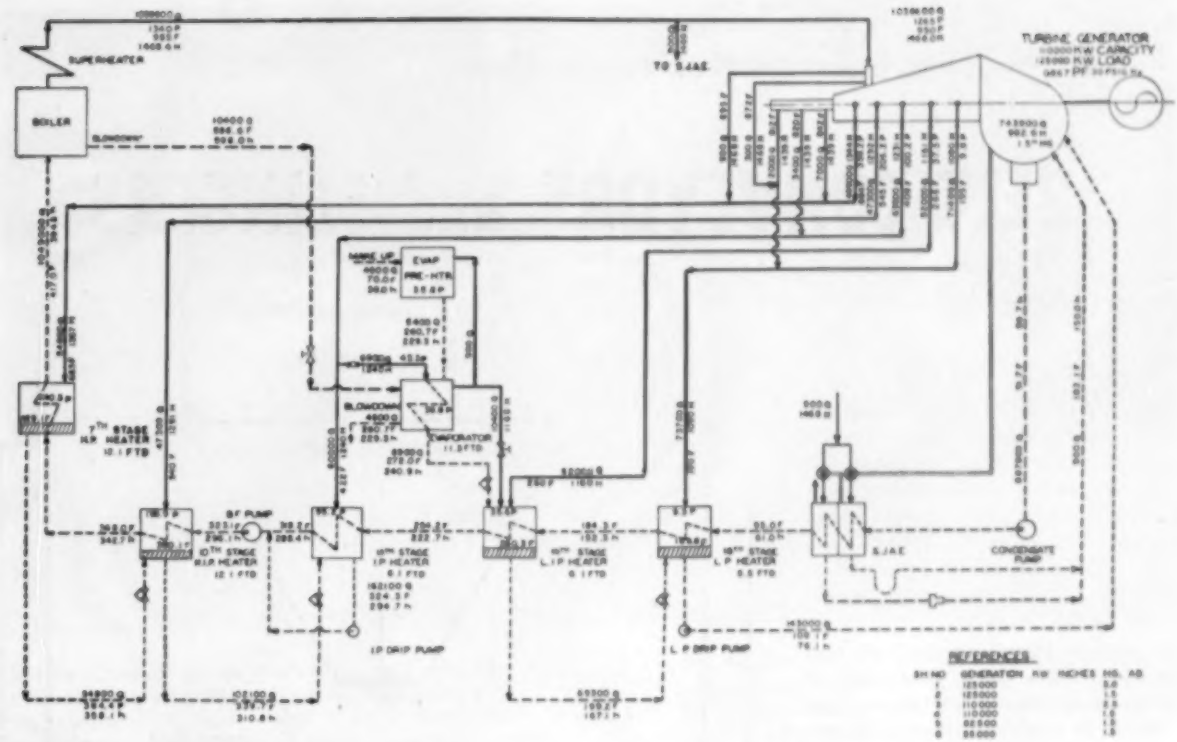
Boiler .....1—Babcock & Wilcox Co., RB-pressurized furnace, 14,599 cu ft heating surface including furnace. Capacity: 1,100,000 lb/hr maximum, 1,050,000 normal. Design pressure 1500 psig, operating at 1350 psig at superheater outlet. Steam drum 60" dia., steel casing
Superheater .....1—Babcock & Wilcox Co. continuous tube and pendant, 18,628 sq ft, 950 F
Furnace .....1—Babcock Wilcox Co., water cooled, Heating surface of walls 9,634 sq ft.
Air Heaters .....1—Babcock & Wilcox Co., tubular, 288,560 sq ft, Air temperature 11 F inlet, 671 F outlet
Blow-off Valves .....Yarnall-Waring Co., unit tandem 2" and 1½"
Water Columns .....Diamond Bi-Color
Safety Valves .....Consolidated Maxiflow
Boiler Blow-off Tank .....1—Corbett Bros. Steel Co., 60" OD x 8'-6" straight sided
Burners .....18—Forney Engineering Co., DY-6 gas and oil, remote control
Combustion Control .....L & N Co., electric
Fuel Oil Pumps .....2—DeLaval
Fuel Oil Heaters .....3—Griscom - Russell Co., 2—U tube, 1—straight tube closed. 1-150 M lb/hr, 2—75 M lb/hr, steam pressure 110 lb/sq in.

DRAFT EQUIPMENT

Stacks .....1—Custodis Construction Co., concrete, fully lined, 21 ft inside dia, 325 ft above foundation
Breeching .....Heppinstall Steel Works
Forced Draft Fans .....2—Sturtevant, 175,000 cfm, 900 hp motor
Gas Recirculating Fans .....1—Green Fuel Economizer Co., 236,000 lb/hr, 250 hp motor

BOILER FEEDWATER EQUIPMENT

Boiler Feed Pumps .....3—Ingersoll-Rand Co., barrel type, 8 stage, 600,000 lb/hr, 3,675 ft TDH, 3600 rpm, 1,500 hp motor
Bleeder Heaters .....3—Lummus Co., turbine extraction, Horizontal U-tube



PERFORMANCE

GENERATION	TO AUX.	NET OUTPUT
125000 kw	5130 kw	119870 kw

BOILER EFF.	BTU/kw HR NET OUTPUT
80 %	10870
84 %	11100
85 %	11240

LEGEND

W	FLOW LB/HR
P	PRESSURE LB/SQ IN ABS
F	TEMPERATURE °FAHRENHEIT
H	ENTHALPY OF STEAM BTU/LB
h	ENTHALPY OF LIQUID BTU/LB
FTD	FAHRENHEIT TERMINAL DIFFERENCE
———	STEAM
— — —	WATER
———	AIR
	DRAIN VALVE
	CONTROL VALVE
	DRAIN TRAP
	PRESSURE CONTROL VALVE

Flow diagram for Eagle Mountain Plant Unit #1

BOILER FEEDWATER EQUIPMENT

Feedwater Regulators .....1—Republic Flow Meters Co., 3 element, pneumatic
Evaporator .....1-Alco Products Co., 30,000 lb/hr reboiler
Filters .....2—Graver Water Treating Co., cylindrical, pressure. Capacity: 150 gpm continuous, 300 gpm short time
Softening Plant .....2—Graver, sodium zeolite, 100 gpm each

PIPE AND COVERING

Piping Contractor .....Pittsburgh Piping & Equipment Co.
Steam Header .....Twin—10", Sched. 160 A335 P12
Check Valves .....Reading, Pratt and Cady
Gate and Globe Valves .....Reading, Pratt and Cady
Pressure Reducing Valves ....Republic Flow Meters Co.
Desuperheater .....Republic Flow Meters Co.
Small Valves .....Manning, Maxwell & Moore
Reverse Flow Valves .....Atwood & Morrell
Automatic Relief Valves .....Manning, Maxwell & Moore, Consolidated
Float Chambers .....Fisher Governor Co.
Traps .....Yarnall-Waring Co.
Drainers .....Fisher Governor Co.
Expansion Joints .....Zallea Bros., corrugated stainless steel
Pipe Covering Contractor ....Johns-Manville
Pipe Covering Material .....Johns - Manville, premolded block; Super X, magnesia and thermobestos

INSTRUMENTS

Steam Flow Meter on Boiler..1—Bailey Meter Co.
Boiler Meter .....1—Bailey Meter Co.
Feedwater Flow Meters .....1—Republic Flow Meters Co.
Draft Gages .....5—Eclipse Pioneer
1—Bailey Transmitter
Pressure Gages .....American Chain & Cable Co. indicating; and Bailey and Republic recording
Vacuum Gages .....U. S. Gage Co. indicating
Mercury Columns .....Uehling Instrument Co.
Thermometers .....Palmer Instrument Co., indicating; and Leeds & Northrup, recording
Condensate Conductivity Recorder .....1—Leeds & Northrup, Micromax
Oxygen Recorder .....Leeds & Northrup
Barometer .....Uehling Instrument Co. mercury column
Plant Water Meter .....Weil Machinery & Supply Co.

ELECTRICAL EQUIPMENT

Switchyard Contractor .....Muskogee Iron Works
Main Transformers .....2—Pennsylvania Transformer Co. Each 56-70 mva
Auxiliary Transformers 2—General Electric Co.
Breakers and Disconnects ...General Electric, and Delta Star
Storage Battery .....Electric Storage Battery Co., lead acid 125 v, 800 amp hr
Inverter .....1—Continental Electric Co., 5 hp., 3 kva
Battery Charger .....1—Electric Products Co., 15 hp., 7.5 kw, diverter pole

MISCELLANEOUS

Fire Pump .....1—DeLaval
House Service Pumps .....2—Peerless Pump Co.
Air Compressors .....4—Chicago Pneumatic Tool Co., type PB, vertical 2-stage. 2—458 cfm and 2—115 cfm. Motors are 100 hp and 25 hp respectively
Gantry Crane .....Colby Steel and Mfg. Co., 50 ton with 15 ton auxiliary
Water Tank .....1—Chicago Bridge & Iron Co., elevated, 100,000 gal.

Modern Handling in Savannah, Georgia, Plant

BELT CONVEYORS and SLINGERS

A FERTILIZER plant, such as the Southern States Phosphate & Fertilizer Company, Savannah, Ga., handles almost 100% of its materials by conveyor belts. Huge quantities of light-weight, fine materials must be weighed, mixed, stored, bagged or loaded into freight cars.

Several ingenious methods and devices have been developed at the Southern States plant that would be useful in other bulk handling operations.

A versatile system of movable and fixed conveyor belts provides a means of carrying ingredients into the plant, placing in anyone of a large number of storage bins, delivering to the weighing station, returning to storage or to bagging or to freight cars.

A long fixed belt runs high up in the plant perpendicular to the tracks at the railroad siding. Two movable conveyors mounted on tracks receive material from the fixed conveyor and place it in bins according to the position of the movable conveyor.

Mixing

The mixing phase starts at the scale hoppers. Each of the seven hoppers hold 20 tons of an ingredient. Weighed amounts of each component (in 1½ ton increments) is dropped onto the 30 in. wide, 60 ft long Thermoid conveyor belt running under the hoppers at 280 fpm.

Being light and fine, excessive loss of the carefully weighed components as dust and spillage from the belt is reduced to negligible amounts by skirt boards which form a seal with the belt when material is being carried.

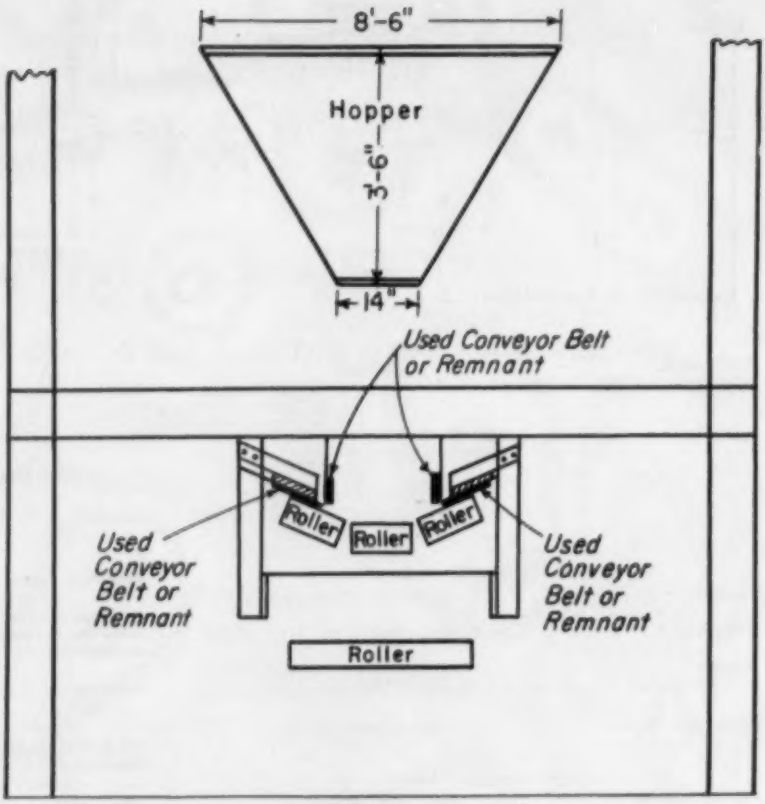


Fig. 1

Excessive loss of material from conveyors is prevented by skirt boards made of old belt. When no material is being carried, the skirt boards do not contact the belt.

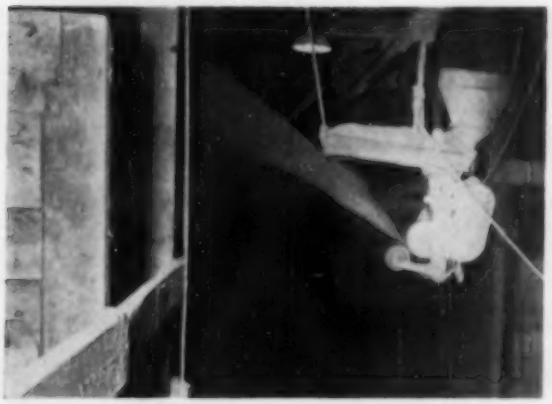
The skirt boards, as shown in Figure 1, are made of an old conveyor belt attached to wooden frame work. When no material is being carried, the skirt boards do not track the belt. When material is dropped out of the belt from a scale hopper, it forces the flexible skirt boards to form a seal with the conveyor belt and prevents spillage and dust. The skirt boards are only in contact with the belt when material is being carried. The skirt board runs the full 60 ft length of the conveyor and was designed and built by Southern States engineers.

The ingredients are delivered by the horizontal belt to a vertical bucket conveyor which elevates the material 45 ft to a mixing drum which feeds to a screen. The long fixed conveyor takes the completed fertilizer from the screen

Shuttle conveyor moves on rails to reach any one of several bins on either side of the fixed conveyor. The conveyor carriage is moved by a winch attached to the driver pulley shaft and a rope.

Figs. 2 and 3

This slinger unit receives material from the shuttle conveyor and delivers it in a pile 9 ft high up to 35 ft from the slinger. Thermoid developed a special highly flexible belt for this service.



Another slinger is mounted on a monorail to deliver fertilizer into bins on either side of the monorail. Material is dropped into slinger hopper from shuttle conveyor.

Figs. 4 and 5

The slinger is used to load cars. Material comes from plant on fixed conveyor belt and down pipe into slinger hopper. Slinger can be swiveled to load both ends of the car.

to either of two movable conveyors which carry it to the desired bin, if it is to be stored.

The movable conveyors deliver to bins on either side of the building. The conveyors are mounted on a wheeled carrier designed and built by Southern States which run on tracks extending 450 ft down the length of the building. The conveyors are moved by winches attached to the axle of the driver pulley (Figure 2).

Slingers

Excellent use is made of slingers or trimmers. The unit shown in Figure 3 is powered by a 5 hp motor and can handle 60-80 tph on its 24" belt. It is useful in filling all parts of a large bin with one setting of the shuttle conveyor (Figure 3). It can build a pile 35 ft away 9 ft high.

The high speed of the slinger belt (2100 fpm), the relatively small diameter of pulleys (8") and the short center distance of the pulleys caused extremely high belt mortality. Thermoid engineers changed the belt specifica-

(Continued on page 66)

ISOSCOPE—New Inspection Tool

A NEW inspection tool which makes use of radioactive Cobalt 60 and is capable of radiographing—or "seeing through"—thickness of steel up to seven inches, has been developed by The Babcock & Wilcox Company.

The unit has been christened the *Isoscope* a derivation of the words *isotope*, a radioactive material, and *scope*, for the power to see through metals. The *Isoscope*, which has been under study and development by B&W for the past three years, requires only one-third the exposure time of a million volt X-ray unit.

The largest allocation of radioactive Cobalt 60 ever authorized to industry for radiographic work was assigned to Babcock & Wilcox for the *Isoscope* at Oak Ridge National Laboratory on October 11, 1954. The material was loaded into a special dual-purpose spherical lead container designed by and built by B&W to handle the radioactive material during shipment.

The lead sphere of the *Isoscope* is encased in a steel jacket having a cylindrical rotor section built into it. By revolving the rotor 180 degrees the radioactive source can be brought from the "safe" position to a point in line with the coned opening in the steel jacket allowing a beam of radiation to escape. This, in effect, results in a unit which can be turned *on* and *off*.

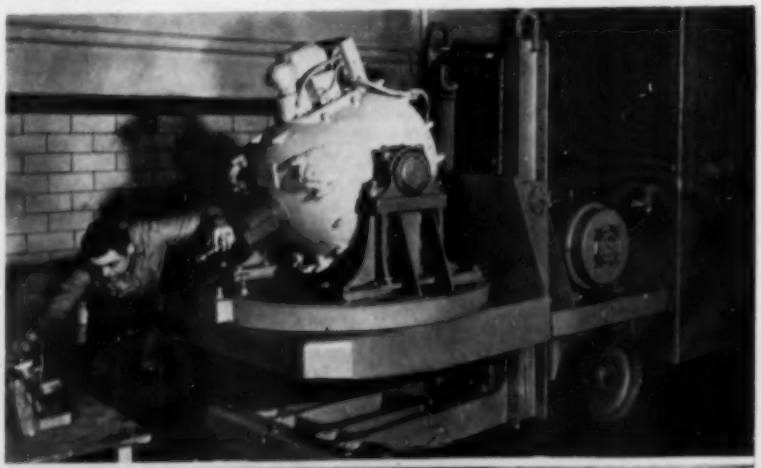
The total charge placed in this unit was 1008 curies of Cobalt 60. The charge is comprised of small discs stacked one on top of the other like coins in a coin changer. The radiation is taken from the top of this stack so that the focal spot size compares favorably with existing high voltage X-ray equipment.

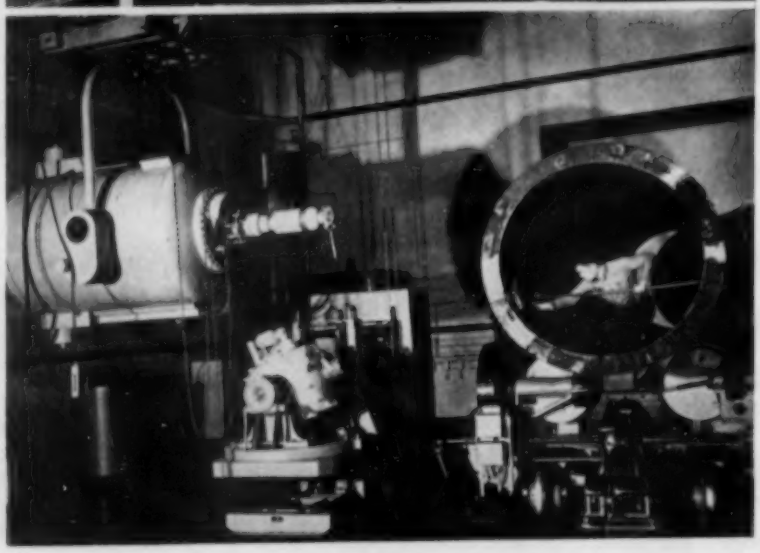
The balance of the *Isoscope* consists of a modified electric platform lift truck having a lead cab built on the back and a turn-table mounted on the front platform. The lead cab provides protection for the operator and contains controls for the operation of the machine.

Babcock & Wilcox believes that the future for this new type of unit seems very good. The announcement pointed out that this tool will enable the small foundries and plants to invest in high energy radiographic equipment where often the cost of high voltage equipment was prohibitive.

Advantages of this unit over high voltage X-ray equipment are as follows:

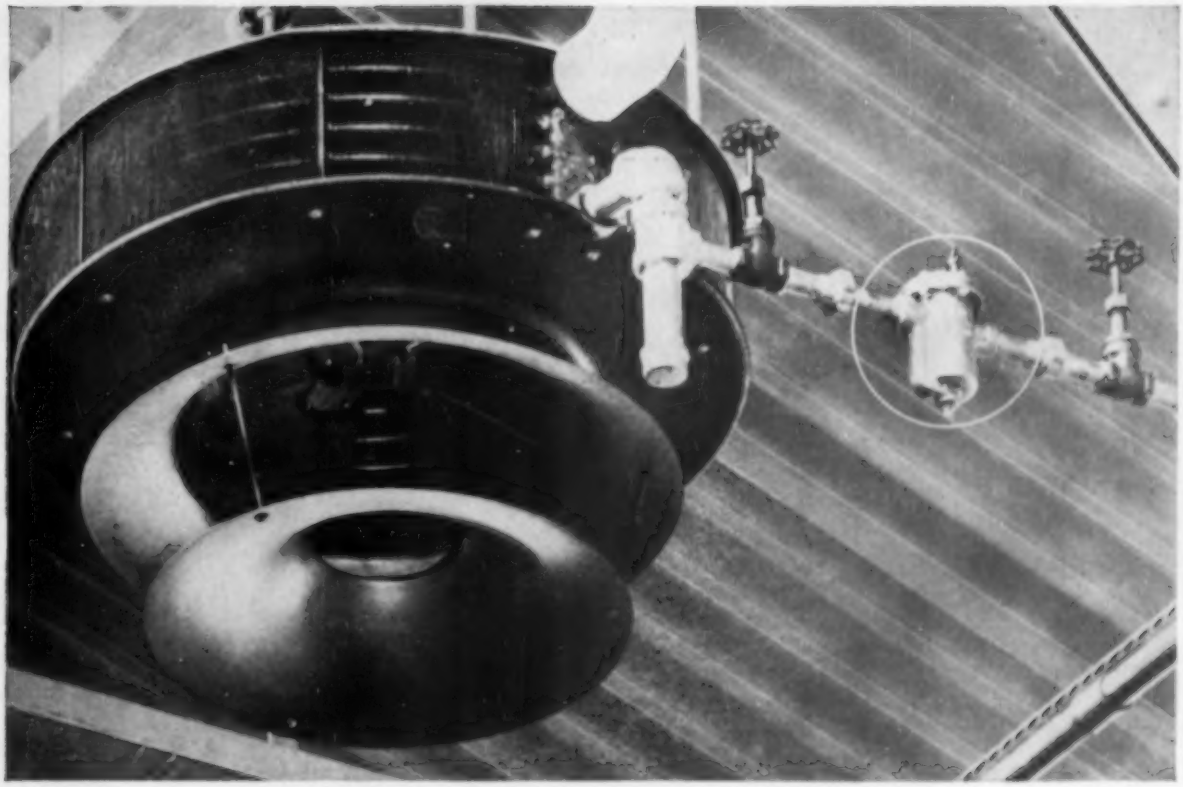
1. Lower initial cost.
2. Less amount of shielding necessary for secondary radiation.
3. Greater mobility.
4. The maintenance and operating costs are a known factor and can be predetermined. This predetermination cannot be accurately made for the one and two million volt radiographic equipment.
5. A mechanical breakdown would not stop the examination being made since the "Isoscope" may be operated manually and the examination completed before mechanical repair is attempted.
6. The simplicity of controls eliminates the need of a highly trained technician for operation of the equipment.





UPPER PHOTO—The Isoscope which makes use of radioactive Cobalt 60 and is capable of radiographing thickness of steel up to seven inches, is being aimed at a test specimen.

LOWER PHOTO—The new inspection tool, under study and development by B&W for the past three years, requires only one-third the exposure time of a million volt X-ray unit. Size of the Isoscope may be compared with the two million volt X-ray machine suspended from the ceiling at the left.



Here's the Way to Trap a Unit Heater for Lots of Heat and Little Maintenance

The picture above is an outstanding guide to good unit heater trapping. This installation provides maximum heater efficiency and minimum maintenance time and cost.

1. Simplified piping. Horizontal in-line piping is made possible by the Armstrong side inlet—side outlet trap body. Note that the trap can be opened by removing the cap, without disturbing pipe connections.

2. Dirt pocket ahead of trap. The vertical pipe leg collects heavy dirt and scale. No strainer is needed because the self-scrubbing action of an Armstrong trap washes ordinary dirt right through it.

3. Test valve. The maintenance engineer can check this trap quickly and easily by opening the test cock shown installed in the trap cap.

4. Shut-off valves and unions. The trap can be repaired, or replaced with a spare trap, without shutting off any other units.

5. Generous sized trap. The Armstrong trap, selected from Table B-29 or C-29 in The Armstrong Steam Trap Book, provides a minimum safety factor of 3 to 1 for this job. Its big air handling capacity keeps the heater free of corrosion-producing air and CO_2, provides fast heat-up and full rated btu output. No lag—condensate is discharged at steam temperature.

6. A good steam trap. The Armstrong trap discharges condensate at steam temperature and it has large air venting capacity. The heater is always full of hot, dry steam.

The Armstrong trap mechanism cannot clog, bind, stick or collapse. Valve and seat are hardened chrome steel—all other working parts are stainless.

An Armstrong trap is rated conservatively on a basis of actual hot condensate capacity under job operating conditions. This is not true of all traps and is an important factor when comparing prices.

Armstrong traps are sold by factory-trained Representatives under an unconditional, money-back guarantee of satisfaction to the user.

For the best in unit heater trapping, call your local Armstrong Representative, or write:

ARMSTRONG MACHINE WORKS
806 Maple Street • Three Rivers, Michigan

FREE — "How to Trap Unit Heaters" is the title of pages 28 and 29 in The Armstrong Steam Trap Book. This 44-page catalog is a guide to good trapping practice. Send for your copy.

STEAM TRAPS FOR EVERY REQUIREMENT — APPLICATION ENGINEERED

ARMSTRONG STEAM TRAPS

World's Largest Integrated Pulp and Paper Conversion Plant Cuts Number of Battery Sizes in Half

BATTERY CHANGING SYSTEM

Reduces Maintenance Cost for Georgia Plant

By LEE CARRIKER
Supt. of Automotive Maintenance
Union Bag & Paper Corporation
Savannah, Georgia

IT TAKES a lot of handling to keep 2,000 tons a day of paper and paperboard moving through the world's largest integrated pulp, paper and conversion plant at Savannah, Georgia. Some 3,000 cords of the Southeast's forest products go into this daily record of production.

The materials handling problems are large and constant. Pulp wood, received on trucks, railcars and barges, is conducted through intricate chemical and mechanical processes to end up as rolls weighing 25 to 6,000 pounds, or hundreds of types of bags and boxes. The equipment necessary to handle this job is centered in the Automotive Maintenance Department, which with the help of alert production and industrial engineering groups is pioneering moves that indicate Union Bag and Paper Corporation is keeping step with advanced thinking in the field of materials handling.

The Automotive Maintenance Department is responsible for the efficient operation of rolling stock ranging from 40 ton locomotive cranes to the tiniest of personnel vehicles. One important phase of its overall plant function is the maintenance of 106 fork, platform, tractor and rotating apron trucks which run the gamut from 2,000 to 10,000 pounds capacity. Two hundred and eighty-five batteries keep the electric trucks operating for the three shift, seven day operation.

Battery Changes

System is the key to efficient battery handling and maintenance. At one time this operation was performed on a time basis, but this method is gradually being changed over to the more efficient "battery change" basis. By the same token, all regular battery changing and maintenance has been streamlined to provide a fast, accurate routine. To handle the great number of changes only four battery changers are required for the three shift operation and one mechanic on day work.

Standardization

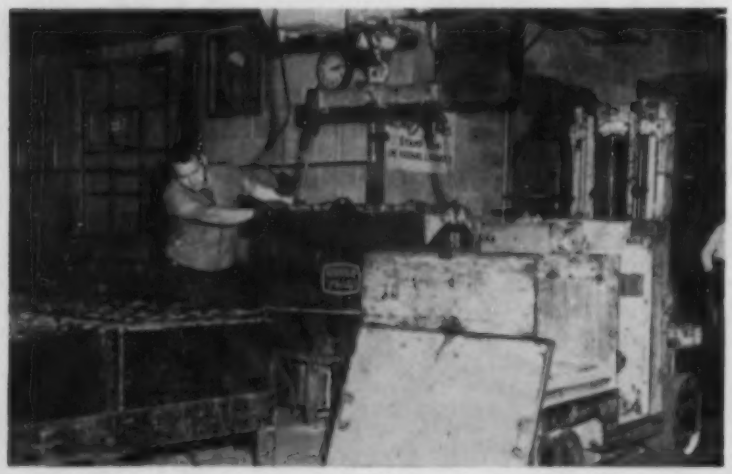
Accurate records are maintained for each battery which has resulted in high battery performance and longer battery life. Like any other piece of machinery preventive maintenance and good records pay off in efficient, cost-cutting performance.

The basis for our record system is a single quickly handled form that gives the record of each battery for each day (see illustration). This slip indicates the battery condition, the time it was on charge, the truck number and the length of time it was in service. A convenient rack just behind the battery charging area makes it easy to locate the record slips and also to collect them each day for the continuing performance records.

Several years ago a survey was

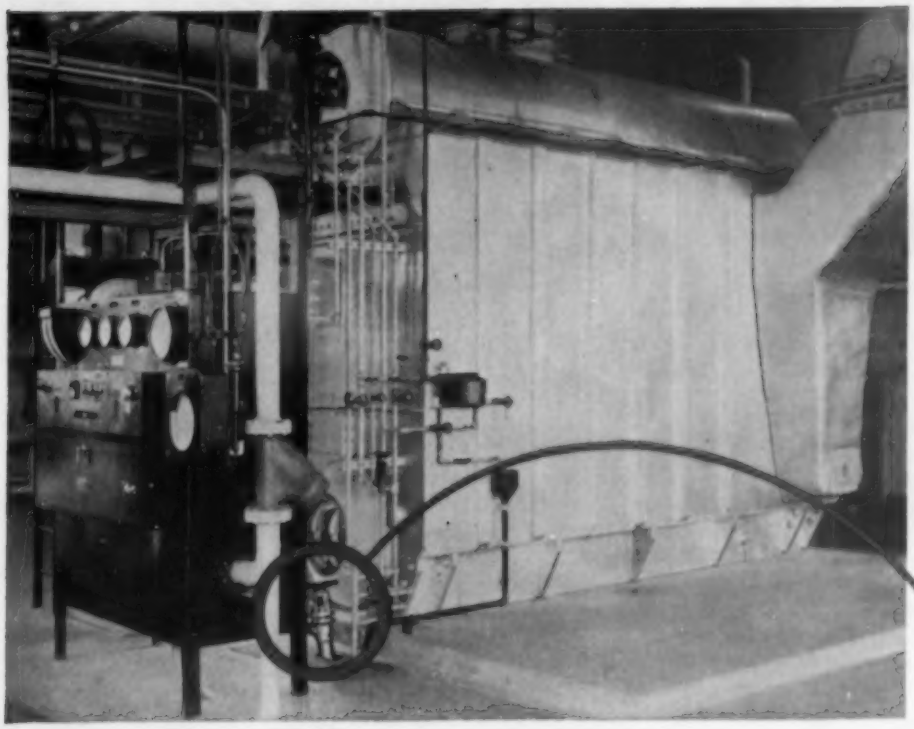
(*Continued on page* 99)

Aisle space is provided for quick, safe travel of the battery changer and the two-way crane speeds battery "spotting."



This check slip (shown 1/2 size) is the key to our battery record system. It provides the facts simply and clearly for a continuing record of each battery and each truck it powers.

BATTERY NO.					
DATE	TIME ON	TIME OFF	S.G.		TEMP.
	TRUCK NO.		TIME IN	TIME OUT	S.G.
CONDITION:-					



COMBUSTION ENGINEERING ADOPTS YARWAY SEATLESS BLOW-OFF VALVES FOR PACKAGE BOILERS

Combustion Engineering, Inc. on this package boiler installation at the Orangeburg Pipe Plant in California, again includes Yarway Seatless Blow-Off Valves as part of the "package."

It's a popular idea—and growing fast. All *good* package-type boiler installations are *better* when equipped with Yarway Seatless Blow-Off Valves.

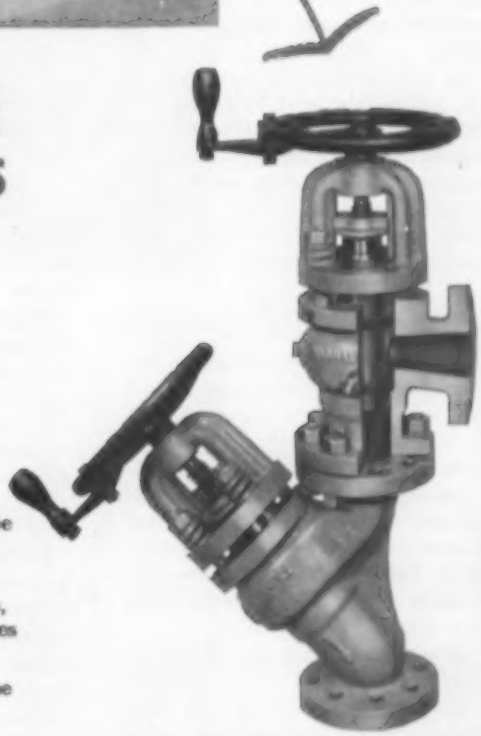
More and more boilermakers are standardizing on Yarways, and more and more boiler users are expecting the advantages of Yarway Blow-Off Valves on their package units.

Get the full story on why more than 15,000 boiler plants use Yarway Blow-Off Valves, some for 30 to 40 years.

YARNALL-WARING COMPANY

Home Office: 116 Mermaid Ave., Phila. 18, Pa.

Southern Representative:
ROGER A. MARTIN, Bona Allen Building, Atlanta 3, Ga.



Yarway Type "B" Seatless Tandem Blow-Off Valve. Note balanced sliding plunger design with no seat to score, wear, clog or leak. Pressures to 400 psi.

YARWAY BLOW-OFF VALVES

Preventive Maintenance in Alabama Plant . .

Operating Without Spare Boiler Capacity

By SAM'L S. WILLIAMS
Consulting Engineer
Birmingham, Alabama

SINCE 1948 there has been practically no reserve steam generating capacity in the plant supplying the manufacturing facilities of the Russell Manufacturing Co., located at Alexander City, Alabama. Yet good service has been maintained, through the untiring efforts of the operating personnel, and the use of preventive maintenance and load stretch-out measures. The average daily steam output of 375,000 lb in 1945 had grown to well over 1,000,000 lb in 1953.

In 1945 the manufacturing facilities occupied a total floor space of 767,730 sq ft. The rated boiler capacity totaled 26,500 lb/hr, and maximum hourly peaks were in the neighborhood of 35,000, and low loads during night operations were about 6,000 to 7,500 lb.

One New Boiler

There being no reserve and the steam generating equipment being in the mid-range of economic fuel utilization, management decided to install additional equipment. And although the projected rate of increase of steam load indicated that an additional unit would be needed within five years, only one 40,000 lb/hr Babcock and Wilcox integral furnace powdered coal fired boiler was selected.

Regulation at the low-load night operation period was a primary consideration. The changing from 150 lb distribution pressure to 250 lb was also important, since the trend indicated that the process equipment would require higher pressures in the future.

During the installation period of the 40,000 lb boiler addition, the manufacturing facilities were steadily increased so that the new boiler was well loaded during some sixteen hours of the normal operating day, with a relatively light load during the 10 P.M. to 6 A.M. shift. Even with the increased load, the annual fuel consumption was decreased 6.5%.

By early 1948 the loading had increased to where additional steam generating equipment was very desirable, and cost estimates and preliminary plans were made. Opportunities for profit by expanding processes and retiring uneconomic machinery were more attractive to management, however, and the boiler addition was deferred. In 1950, additional steam generating capacity was again considered, and again deferred.

By 1953 the total floor space of the manufacturing establishment had increased to 1,310,630 sq ft or nearly double that of 1945. But still, for various operating and business reasons, no additional boiler was installed.

Preventive Maintenance

While there has been nothing spectacular in the preventive maintenance used to insure good and adequate steam supply service, eternal vigilance has been stressed regarding:

1. Maintenance of traps.
2. Adequate means of returning all condensate to boiler plant.
3. Prompt repair of all steam piping leaks.
4. Maintenance of daily records of generation and distribution, and prompt investigation of any unusual deviation from averages.
6. Careful inspection of delivered coal to maintain quality and maximum output from boilers.

Coal Selection

It is axiomatic that in all combinations of apparatus in an integrated operation there will be a limiting factor of performance. In a powdered coal plant this can easily be the grinding capacity of the mill, within the range of the coals of the marketing area. Therefore the selection of coal with due regard to its grindability index becomes necessary when capacity is at a premium.

In this instance it was found that by selecting the proper coal, a gain of from 5,000 to 10,000 lb capacity could be secured. This meant up to 25% over boiler rating, and due to the stamina of the integral boiler such loads have been imposed continuously for long periods. Proper treatment of feedwater under such conditions also becomes very important and requires careful attention of the operator.

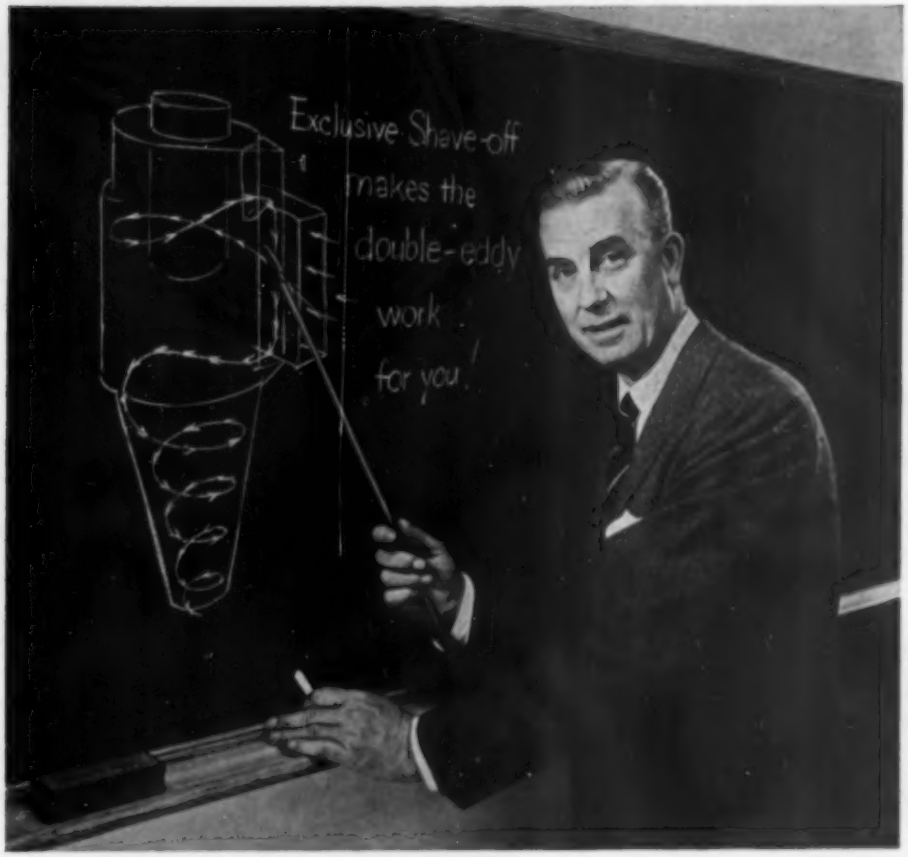
Hot Water Demand

Load studies covering the period 1945-48 had demonstrated the idle capacity represented by the period from 10:00 P.M. to 6:00 A.M., when only a part of the bleachery operations were active. As a widely varying demand for heated water (50 to 500 gpm) is inherent with bleaching work, this demand, if not tempered by some means, could put a staggering overload on the boilers.

In 1948 two 20,000 gallon tanks were provided and arranged to supply heated water under gravity head to this operation. This allowed the water to be heated during the off peak hours, so that when the maximum demand occurred the tanks would be full of

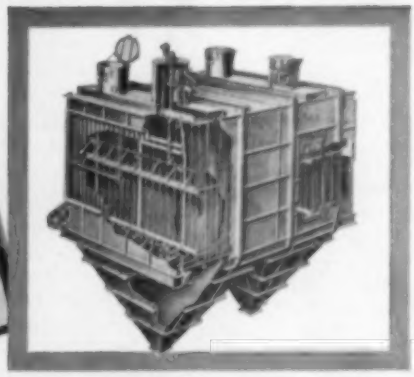
(*Continued on page* 100)

How Buell delivers the EXTRA PERCENT in Dust Collection Efficiency

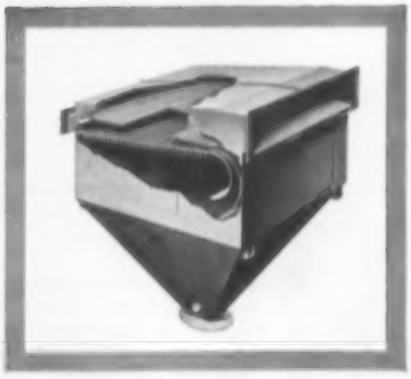


In any cyclone dust collector there is an upward eddy preventing the separation and dropping-out of a percentage of particles. But in Buell Cyclones, the exclusive Buell shave-off design *harnesses* this up-flow—puts it to work! Result: extra efficiency without extra operating cost!

For the complete story behind Buell's *extra efficiency*, write Dept I-80. Buell Engineering Company, 70 Pine Street, New York 5, N. Y.



SF Electric Precipitator, a Buell exclusive, also delivers *extra efficiency* due to unique Spiralectrodes and continuous cycle rapping.



Buell's Low Resistance Fly Ash Collector combines top efficiency with low draft loss, for either natural or forced draft installations.

MECHANICAL ELECTRICAL

buell

Experts at delivering Extra Efficiency in **DUST COLLECTION SYSTEMS**

Steam Generators of offer important savings

Advanced design features of Foster Wheeler "SC" Series Standard Steam Generators mean maximum economy of installation, operation and maintenance

FUELS: Oil or Gas
CAPACITIES: 50,000 to 150,000 lb/hr
STEAM PRESSURES: to 1500 psi
STEAM TEMPERATURES: Saturated to 950 F

The "SC" Series Standard Steam Generator is the latest development by Foster Wheeler toward the reduction of steam costs for manufacturing and process plants. Pre-engineered in all details and standardized for economy, the new units are available in nine sizes with maximum input of over 200 million Btu/hr.

Although dimensions and structural details are fixed, the design provides a wide choice of temperatures and pressures, 48" or 54" upper drums, balanced draft or pressurized firing, type and location of heat recovery equipment, fans and drive, and make of burners for oil or gas firing.

The advanced features of this design, some of which are noted below, contribute to low installation, operating and maintenance expense and maximum dependability under continuous, full-load operation.

1. **COMPLETELY WATER COOLED FURNACE** with 3" OD closely spaced tubes minimizes setting maintenance and prevents excessive exit gas temperatures.
2. **OVER 19 FOOT FIRING DEPTH** permits long horizontal flame travel with minimum of ineffective or unused furnace volume.
3. **FULLY DRAINABLE SUPERHEATER,** available when superheat is desired, simplifies operation and eliminates a potential trouble spot.
4. **STEAM PURIFYING SYSTEM** consisting of horizontal separators, chevron driers and dry box provides steam purity of less than 1 PPM.
5. **EFFICIENT CONVECTION SURFACE** of 2" OD tubes in a staggered, cross-flow arrangement, combines maximum heat transfer with minimum draft loss. Single-pass boiler section eliminates baffles, dead gas pockets, and further reduces maintenance and draft losses.
6. **UNRESTRICTED CIRCULATION** — Absence of headers provides free circulation through integral risers and downcomers, eliminates header handhole plates and gaskets as possible sources of leakage.
7. **FULL INSULATION** together with the relatively close spacing of the furnace tubes, results in low casing temperatures.
8. **BOTTOM SUPPORTED UNIT** fully utilizes the structural strength of the steel tubes and provides for free expansion of all pressure parts within a stationary casing. This provides low unit stresses in all members and results in a rugged structure that is economical to erect and install.
9. **ALL WELDED CASING** forms a rigid, pressure-tight unit. Possible sources of air and gas leakage are reduced to a minimum, thus providing lower operating costs through more efficient combustion.

LONDON • NEW YORK
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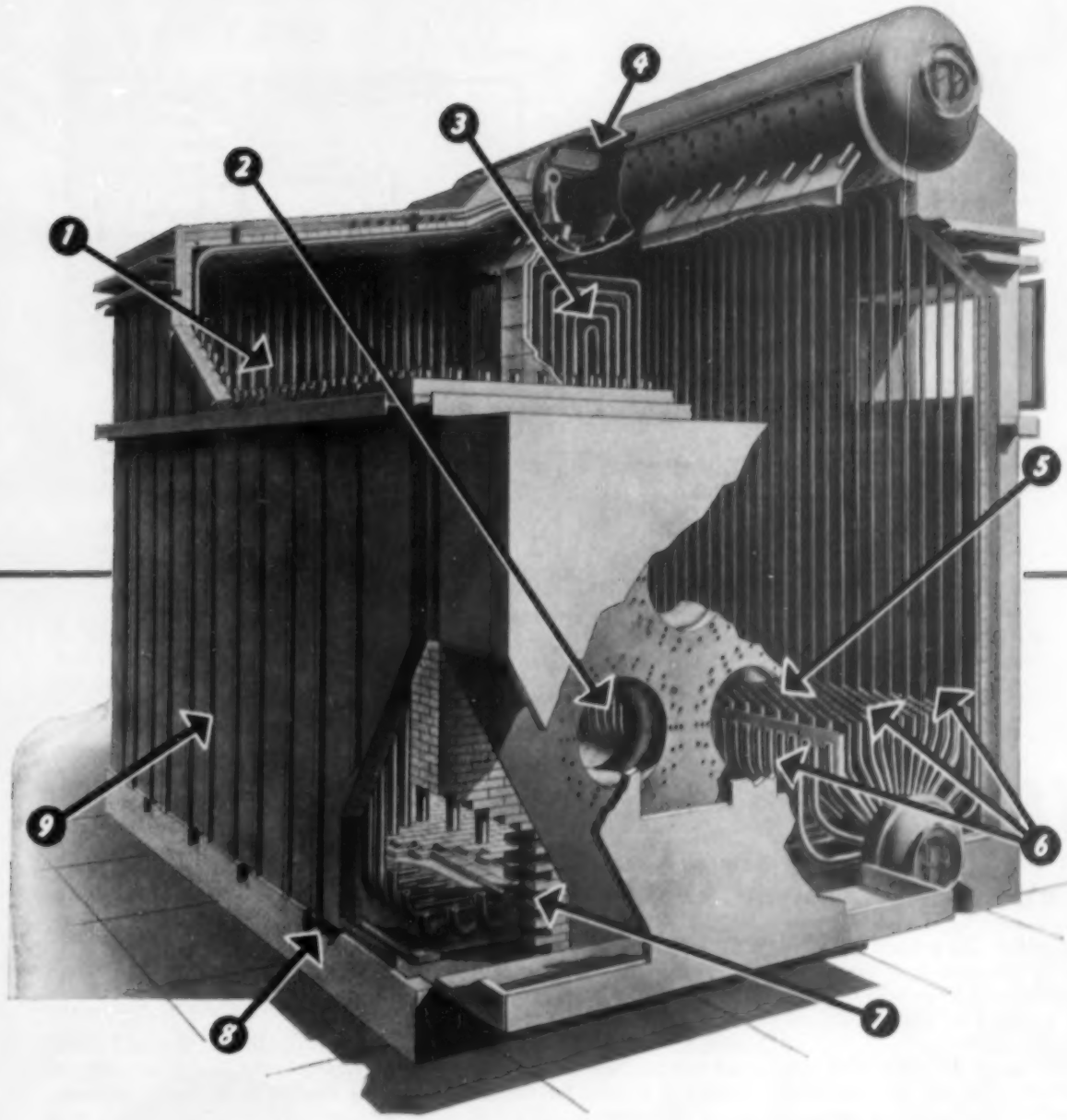
FW FOSTER

STANDARD DESIGN

in industrial steam costs



WHEELER

FOR COMPLETE INFORMATION on the "SC" steam generators, write to *Foster Wheeler Corporation, 165 Broadway, New York 6, N. Y.*

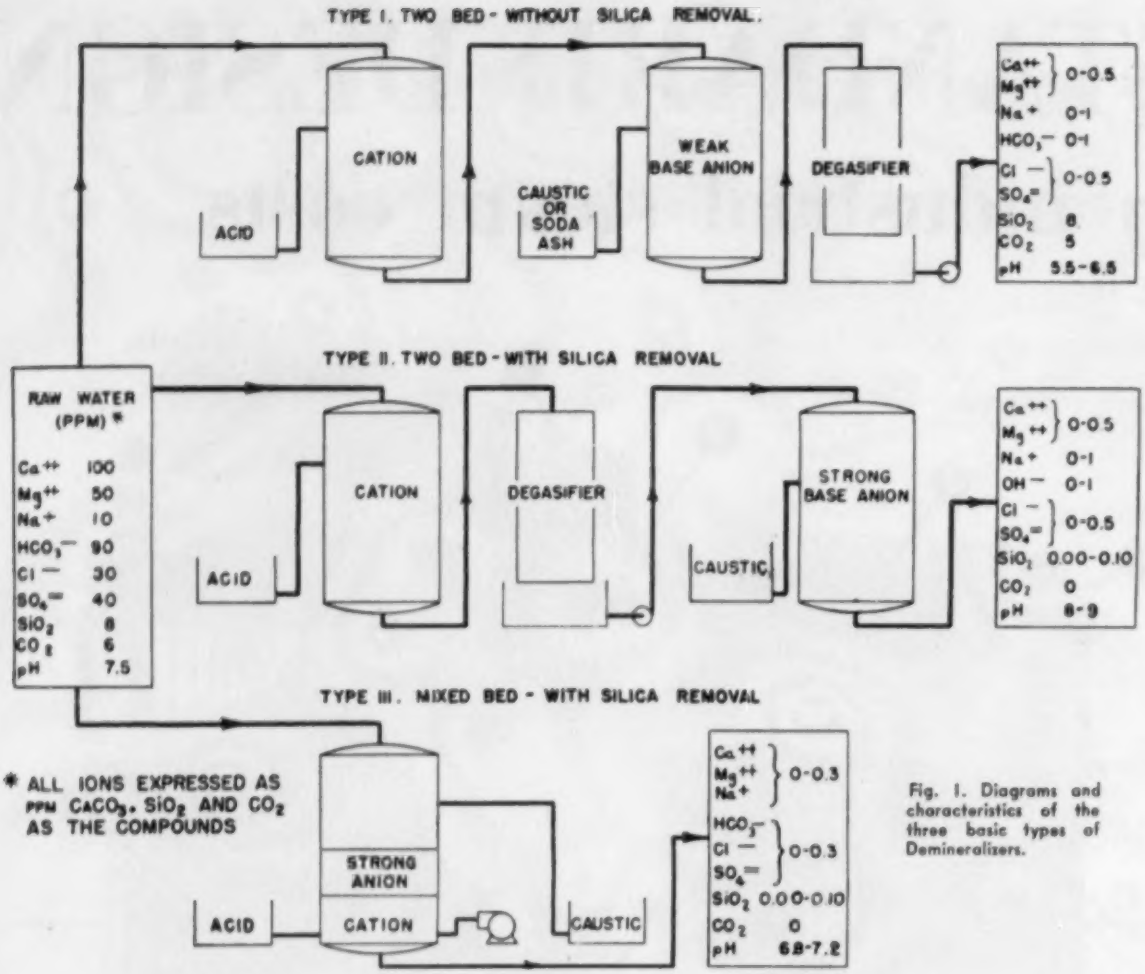


Fig. 1. Diagrams and characteristics of the three basic types of Demineralizers.

Estimated Operating Cost of WATER DEMINERALIZATION PLANTS

By LEONARD LEMON
Industrial Boiler Feed Department
Graver Water Conditioning Company

ESTIMATION of potential operating costs of a water demineralizing plant can prove a valuable tool to the engineer in determining which type of system will provide the most effective and economical demineralization.

Depending on the analysis of the raw water to be used and the final composition of treated water required, one of three basic methods can be employed. (See Fig. I.)

Type I

This method, a two-bed demineralizer with a weak base anion exchanger, has the lowest operating cost but does not remove silica. Although it is used for many manufacturing purposes, it is not suitable for the higher requirements of boiler feedwater.

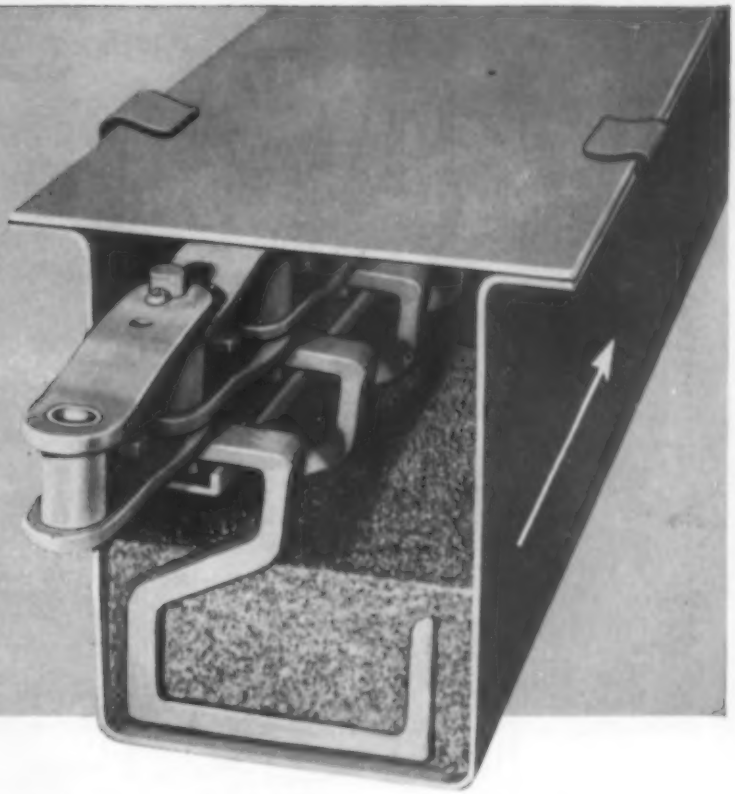
Type II

This method reduces the total electrolytes to the same level as in Type I. In addition, it effects almost complete removal of silica and carbon dioxide. It has numerous manufacturing applications but is used chiefly for boiler feedwater treatment. When an even higher degree of purity is desirable, this method can be modified to a three- or four-bed system. Removal of the degasifier will lower the initial equip-

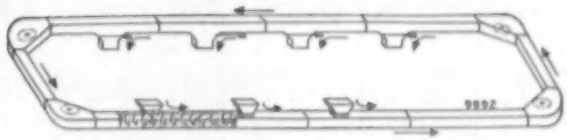
CONVEYS ANYTHING

Economically from COAL to CORNSTARCH

with simultaneous pick-up or discharge at one or many points . . . without dust or contamination . . . in small space



This is an S-A REDLER Horizontal Closed Circuit Conveyor — and a very remarkable unit it is!



It conveys in four directions — can pick up and discharge at many points on its run simultaneously or selectively—does the work of several conveyors of other types. It is fully enclosed — dust-tight and contamination-proof. Because it moves materials *in mass*, in a solid column, it minimizes dust formation and degradation and practically eliminates explosion hazards.

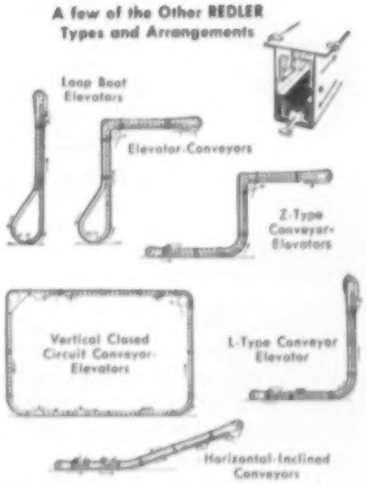
It is self-feeding and can be choke fed without jamming. Any excess material simply recirculates until needed. The REDLER is also self-cleaning, an important advantage when the operation calls for running various materials in sequence. It makes an ideal blending conveyor.

Unusually compact, REDLERS require a minimum of structural support. They can be easily and economically adapted to practically any plant layout.

The closed circuit REDLER is just one of many types furnished by S-A. If you handle or work with any kind of granular, pulverized, flaky or small lump material, a REDLER can help you do it better, cleaner and at lower cost.

Write for Catalog No. 140. We'll be glad to give you a preliminary cost estimate. No obligation, of course.

A few of the Other REDLER Types and Arrangements



STEPHENS-ADAMSON MFG. CO.

86 Ridgeway Avenue, Aurora, Illinois • Los Angeles, Calif. • Belleville, Ontario

Engineering Division
Specialists in the design and manufacture of all types of bulk materials conveying systems.

Standard Products Division
A complete line of conveyor accessories including centrifugal loaders—car pullers—bin level controls—etc.

Sealmaster Division
A complete line of industrial ball bearing units available in both standard and special housings

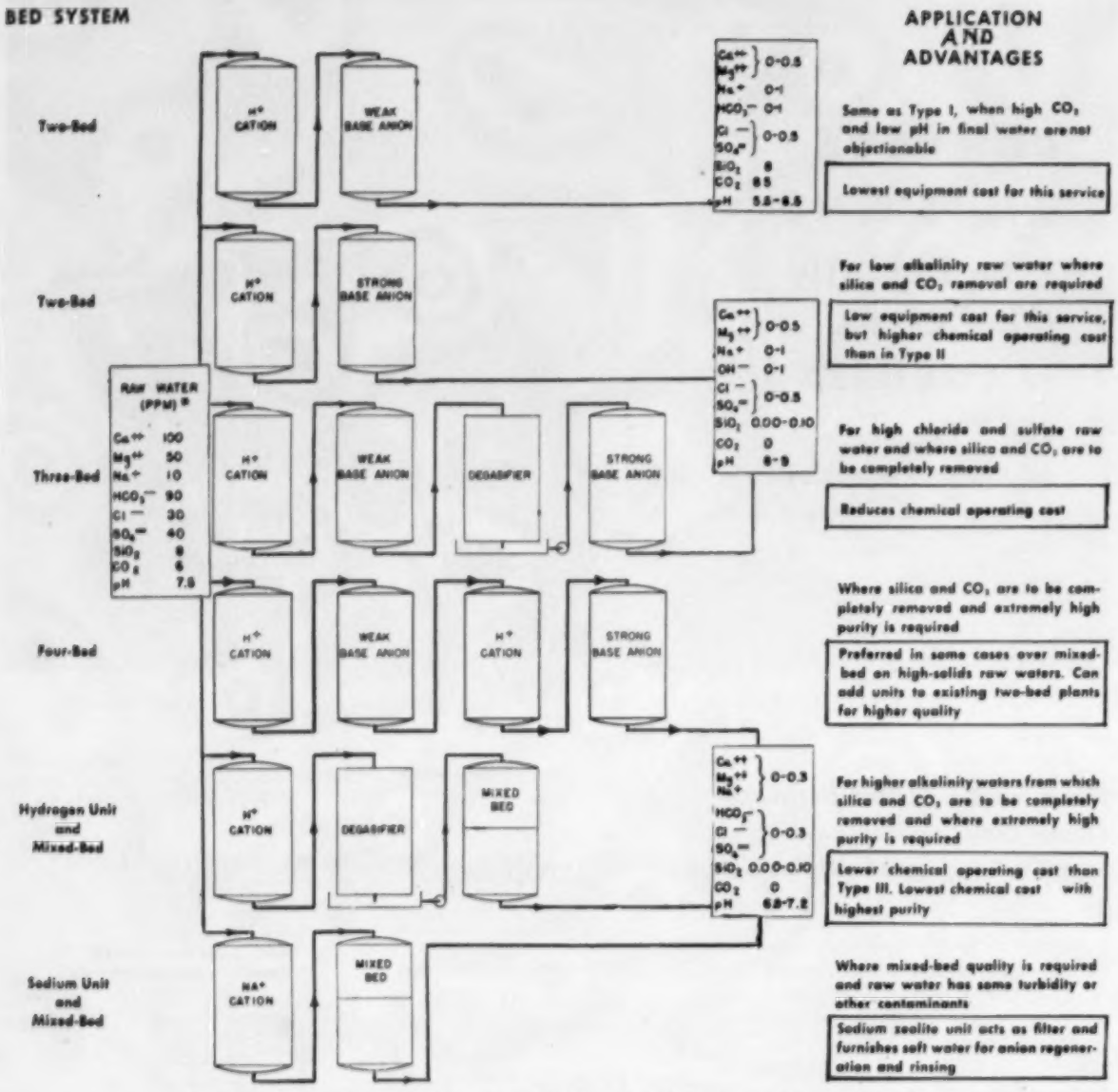


Fig. 2. Diagrams and characteristics of modifications of the basic types of demineralization.

ment cost but will increase the chemical operating cost.

Type III

This method provides even more complete removal of strong electrolytes. For this reason it is specially advantageous when high quality treated water is desired from water containing a large amount of dissolved solids, and when the allowable limit of electrolytes in the treated water is extremely low. This method can be modified by the addition of hydrogen or sodium cation exchangers and a degasifier.

Operating Costs

Modifications of these three basic systems are illustrated with applications, advantages and results in Fig. 2.

Once the choice of a given demineralizing system is made the operating cost involved can be estimated by using the chart in Fig. 3. Such a chart can often be of assistance in making the choice itself since in showing relative costs, it can help determine whether a more complete demineralizing system would be economically feasible.

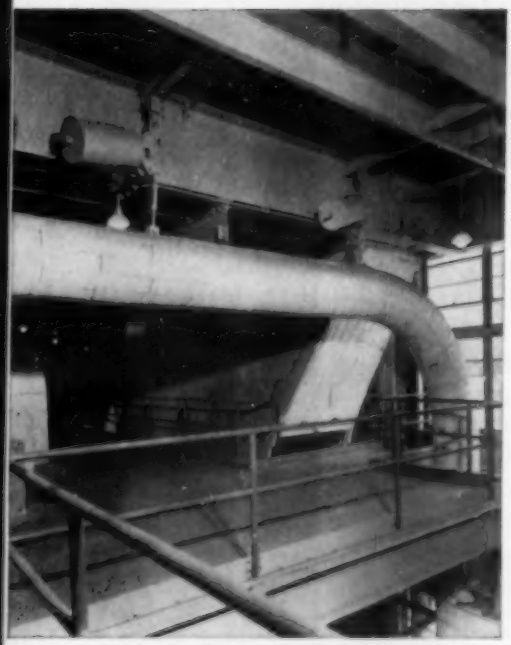
In determining the estimated chemical operating cost of the various demineralizing systems, the following procedure should be employed:

1. Obtain an analysis of the water to be treated and by using the correct conversion factors express all constituents in ppm as Ca CO_3.

2. From the analysis, obtain the total cations (ppm as Ca CO_3). This is the sum of the Ca, Mg, and Na (ppm as Ca CO_3).

3. Also obtain the methyl orange alkalinity (ppm as Ca CO_3).

4. Calculate the per cent alkalinity. Methyl Orange Alkalinity ÷



This station, having an initial capability of 276,000 kw, was designed and erection supervised by Gilbert Associates, Inc., Reading, Pennsylvania. It is one of the most efficient and low-cost stations in the country.

At the new Shawville Station of Pennsylvania Electric Co.

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The photo above shows one of the bends required for the Main Steam. It is 16″ O.D. forged and bored with a wall thickness of 3.084″ and weighs 5½ tons. Material is ASTM A-335 P-22—2¼% Chrome. Operating conditions are 1850 psi at 1050°F. initial, with 1000°F. reheat.

The photo at the left shows this bend in service supported by dependable Navco Counterpoise Hangers.

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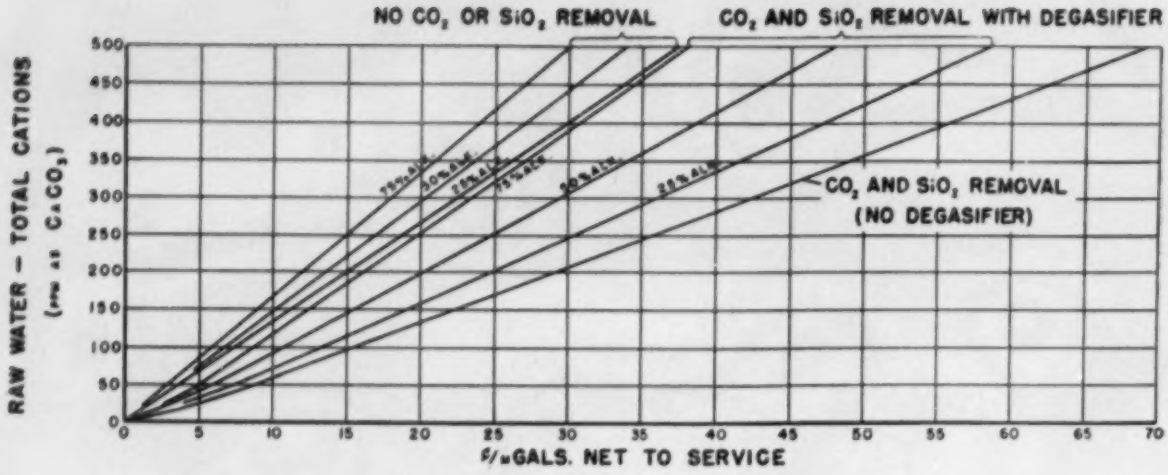

Fig. 3. Curves showing the estimated chemical operating cost of various demineralizing systems. Curve is based on average chemical costs.

Total Cations × 100 = per cent Alkalinity.

5. After deciding which treatment is needed, locate on the chart in Fig. 3 the intersection of the lines of total cations and per cent alkalinity. Then read down to find the chemical operating cost in cents per 1,000 gallons of net water to service.

Example

For example, using the analysis in Fig. 1 we can determine for this particular water what the relative cost of demineralizing will be for each individual type of system.

Since the constituents are already expressed in ppm as Ca CO_3 we need merely to add up the cations to get the sum of 160 as total cations. The Methyl Orange Alkalinity is 90. Fitting these figures into the formula, (90 ÷ 160) × 100 = 56.3%, we get 56.3% alkalinity.

Next, we must find on the curve the intersection of the line for 160 total cations with the line representing 56.3% alkalinity for each demineralizing system. With no CO_2 or SiO_2 removal the cost per 1,000 gallons net to service would be approximately 11 cents. With CO_2 and SiO_2 removal including a degasifier it would be approximately 15 cents, and for the system with no degasifier it would be approximately 23 cents.

Naturally, as the degree of demineralizing becomes more complete the cost rises. It is for the engineer to decide whether the completeness of demineralization obtained in a given system is justifiable considering the initial and operating cost of the equipment.

The figures used on the curve are based on average chemical costs which, of course, are subject to normal variation.

Belt Conveyors and Slingers Handle Raw Materials—Georgia

(*Starts on page* 52)

tions from a standard heavy conveyor belt to a modification of the flat belt used in power transmission. Standard conveyor belt is relatively thick because of the rubber cover. Constant flexing around the pulleys caused an undue temperature rise and short life. Thermoid reasoned that with a non-abrasive material such as fertilizer, a thin belt without a heavy rubber cover and with a thinner carcass would give better life. The new belt design has outlasted the old many times.

Southern States makes ingenious use of a smaller slinger unit with a 10″ belt powered by a 3 hp motor (Figure 4). This unit is mounted on a monorail running the length of the building. Complete fertilizer or components drop into the hopper and can be placed at a high rate within 35 ft on either side of the monorail.

Another slinger is used as a carloader (Figure 5). The unit is called a swivelloader. Material is conveyed out of the plant on an extension of the fixed conveyor to a large pipe leading into the hopper of the swivelloader. It is mounted on a swivel on a post and can be positioned to load both ends of the car on each track.

The system of conveyor belts and slingers has reduced manhours and cost appreciably.

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See page 108

J-M 85% Magnesia is lightweight . . . easy for workmen to install half-sections on this 10" steam line. Insulation work at the Grace Chemical plant was performed by Young Sales Corporation of St. Louis. Engineering and construction was directed by Foster Wheeler Corporation of New York.

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J-M 85% Magnesia also comes in block form. Here you see it being applied to a vertical drum at a New Jersey petroleum refinery.

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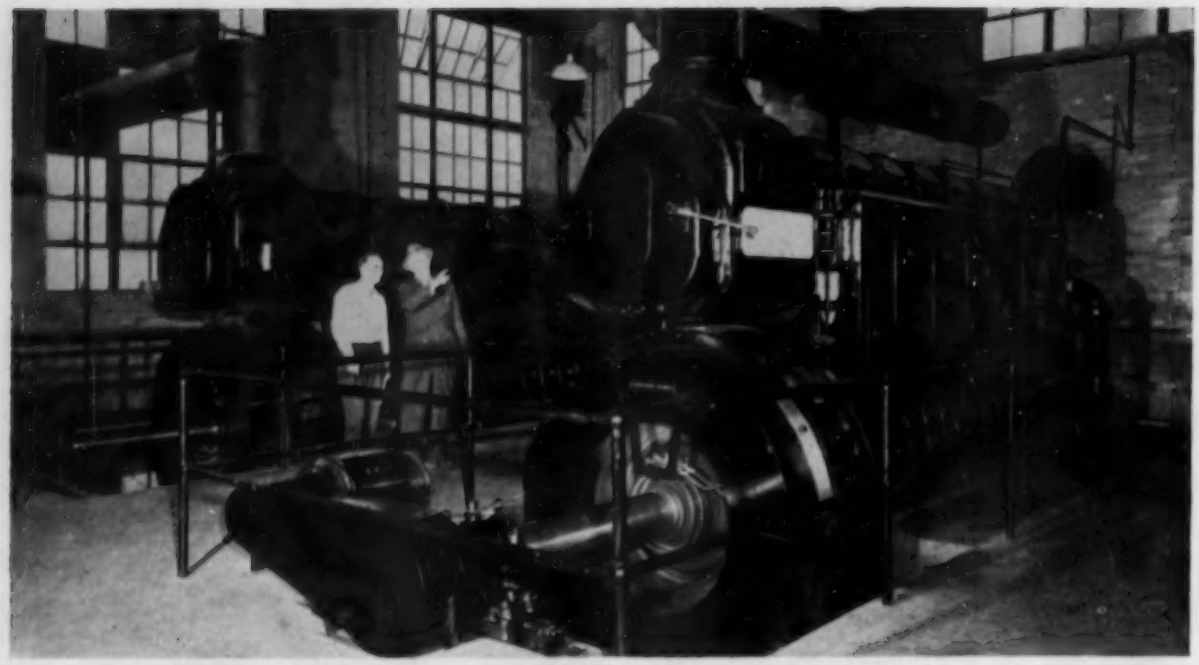

Zane F. Barnes (left), Superintendent of Distribution and Light, and Boone Baldwin, City Managing Agent, inspect the No. 2 dual-fuel O-P engine at the Paris plant. Rated at 1920-hp, at 720 rpm, these two engines drive 1360-kw alternators, V-belted to 15-kw exciters. They have helped cut fuel costs at the plant by 41 per cent.

Dual-Fuel Cuts Operating Costs 31%

THE municipal power plant at Paris, Ky., quickly converted to dual-fuel operation when natural gas became available in that area. Despite a 20-year record of profitable operation under diesel power, the plant undertook a program which in two years has seen more than 93% of its total production converted to dual-fuel. As a result, operating costs have been cut by more than 31%, from 12.4 mills per kwh in 1952 to 8.5 mills in 1954, and fuel costs have been cut even more sharply, from 9.7 mills per kwh in 1952 to 5.7 mills last year, an average reduction in fuel costs of more than 41 per cent.

Chiefly responsible for these savings are three Fairbanks-Morse dual-fuel engines, two of which were installed in 1953 and 1954 and one of which was originally installed as a diesel engine in 1947 and converted to dual-fuel in 1953.

The two new engines are 12-cylinder, 1920 hp., opposed-piston units, driving 1360 kw alternators.

In 1954, the three Fairbanks-Morse dual-fuel engines operated for a total of 11,780 hours, producing 9,382,400 kwh and consuming 110,424 MCF of gas. This represents an average gas consumption of 11.7 cu ft per kwh. At the same time a total of 77,590 gallons of pilot oil was consumed, for an average of .0082 gallons per kw hr. With gas at a price of 38¢ per MCF and pilot oil at a delivered price of 11.5¢ per gal., this represents an average fuel cost of 5.4 mills per kwh. Generation of an additional 628,070 kwh on fuel oil alone brought the plant average to 5.7 mills.

The savings introduced to date by the three dual-fuel engines were achieved despite a relatively high price paid for natural gas, 38¢ per MCF, and despite a clause in the power plant's contract with the local gas utility which specifies that no gas will be delivered when the thermometer drops below 20 F. This is necessary because in freezing weather the gas utility must utilize its full supply to meet the increased residential demands. Due to this clause, in 1954 the power plant was forced to generate 7% of its total production on fuel oil, a factor which to some extent modified the full effects of its dual-fuel conversion.

The 31% reduction in operating costs reported for 1954, when the plant spent a total of $85,504 for superintendence, labor, gas, fuel oil, lubricating oil, maintenance, supplies, and miscellaneous expenses, reflects an estimated saving of $38,625.

Part 1 of a Two-Installment Article

Use of Sea Water in Industry

This two-part article discusses the use of sea water by industry, the problems associated with that use, and the solutions of those problems.

Part 1 (this installment) covers intake and distribution problems.

Part 2 (in a coming issue) will discuss problems encountered when using sea water in various types of industrial equipment.

By A. D. RUST*
Engineering Consultant
The Dow Chemical Company
Freeport, Texas

* This paper was presented before the Corpus Christi, Texas, Section of American Society of Mechanical Engineers. The opinions expressed are those of the author and do not necessarily reflect the opinions of any other person or of a firm.

GENERALLY, clean sea water of near constant analysis is less expensive to handle in an industrial plant than contaminated water of lower salt content. A plant should be located so that the clean water can be taken in and waste water disposed of without danger of recirculation. The balance of all economic factors, however, may indicate that the plant should be located in a harbor where the water is contaminated.

The temperature and salinity of sea water will usually vary with the depth. Water from a 30-foot depth may be 5 to 10 F cooler than surface water. Also, it may have two or three times the salinity.

A thorough knowledge of the behaviour of the sea at the site of the plant will be of utmost importance. Industries along the Gulf Coast do not have to contend with a large range in normal tides, but tides due to wind may cause the water to go to two feet below mean low tide for many hours, or a hurricane may cause water to rise to eleven to twelve feet above mean low tide.

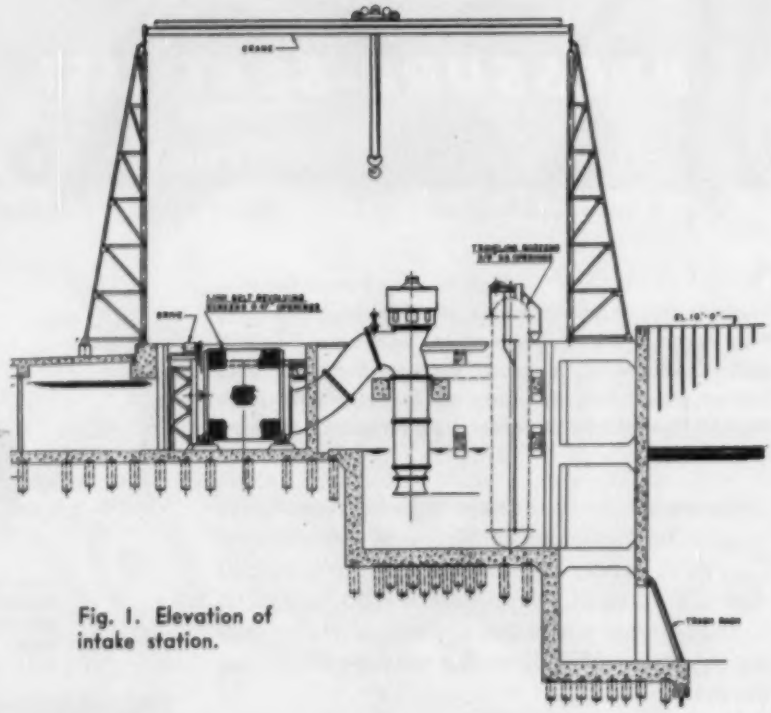

Fig. 1. Elevation of intake station.

PRIMARY HANDLING

Sea water intakes have been built so as to take in water across a beach. These have been completely exposed to all of the vagaries of the weather and the ocean. Such intakes are difficult to maintain and keep open for design flow. On-the-beach inlets have also been built by using pipe running out into the water and located in a manner to avoid most of the wave action and drifting sand problems. If possible, however, plants using sea water should draw it from a sheltered location where the problems due to weather are minimized. With this latter type of inlet the screening and pumping plant may be a composite structure.

The intake structure must be designed to withstand all the actions

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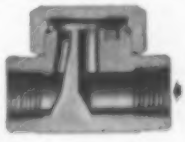

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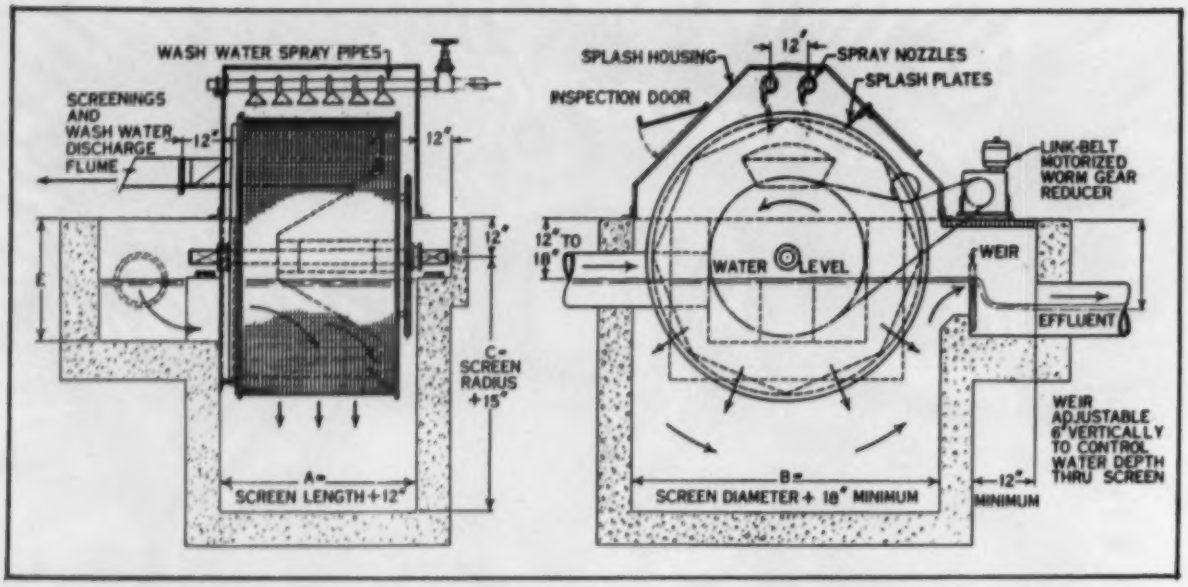

Fig. 2. Revolving drum screen—Side View at left, End View at right.

of storms and tides. Locate the intake as near the point of water usage as possible to keep the canals or pipes as short as possible. The ultimate capacity of the intake should be determined when the original structure is built, because pumps and screens may be easily added if they have been provided for, but it may be impractical to extend the structure. The design of the intake pump station should be such that major maintenance projects can be handled with ease and with a minimum use of divers (Fig. 1).

If small quantities of sea or brackish water are required, a well protected and stable intake may be relatively expensive; then the water pit system should be applicable. This type of intake eliminates many of the difficulties encountered with the inlet built on the shore and cooler water can be obtained (Fig. 2).

Chlorination

A chlorination system must also be considered as a necessary part of any sea water pumping system. Adding chlorine in excess of certain limits will promote corrosion and waste money.

It is probable that a residual of 0.3 ppm in the outlet water will be sufficient to kill all sea life. When too much chlorine is added corrosion rates will increase and also there may be a disposal problem because very small amounts of chlorine will kill fish.

TABLE 1—ANALYSIS OF SEA WATER

Elemental—ppm		Hypothetical Combinations—ppm	
Chlorine	19,605	Sodium Chloride	27,595
Sodium	10,931	Magnesium Chloride	3,836
Sulphate (SO_4)	2,686	Magnesium Sulphate	1,669
Magnesium	1,274	Calcium Sulphate	1,278
Calcium	433	Potassium Sulphate	888
Potassium	390	Calcium and Magnesium Carbonate	106
Carbonate (CO_3)	121	Magnesium Bromide	71
Bromine	60	Other Salts	71
Other Elements	14		
	35,514		35,514

Sea Water Properties

Salinity	3.5%
Density	1.025%
Weight	8.55 lb./gal.
Weight	64.0 lb./cu. ft.

Trash Racks

In the case of on-the-shore inlets the water should pass through trash racks and coarse screens before being pumped. Trash racks are usually constructed of heavy steel bars coated with asphaltic compounds to prevent corrosion. Racks are necessary to keep logs, turtles, or other large objects from damaging the screens or pumps.

Preliminary Screens

The continuous traveling or roller-towel type of screen is the design best adapted to the preliminary screening operation. A screen with ⅜ inch clear opening and heavy gauge mesh should be used.

The screens can operate continuously or operate only when there is material to screen. The operator must be prepared at any time to handle an avalanche of fish, crabs, jelly fish, or whatever may come in the direction of the intake.

Preliminary Pumping

The pumps may be of either the vertical or horizontal type. If the pumps deliver directly into high pressure mains, then a centrifugal pump is indicated. If the pumps deliver into a low pressure system or canal, a mixed flow or propeller

(*Continued on page* 74)

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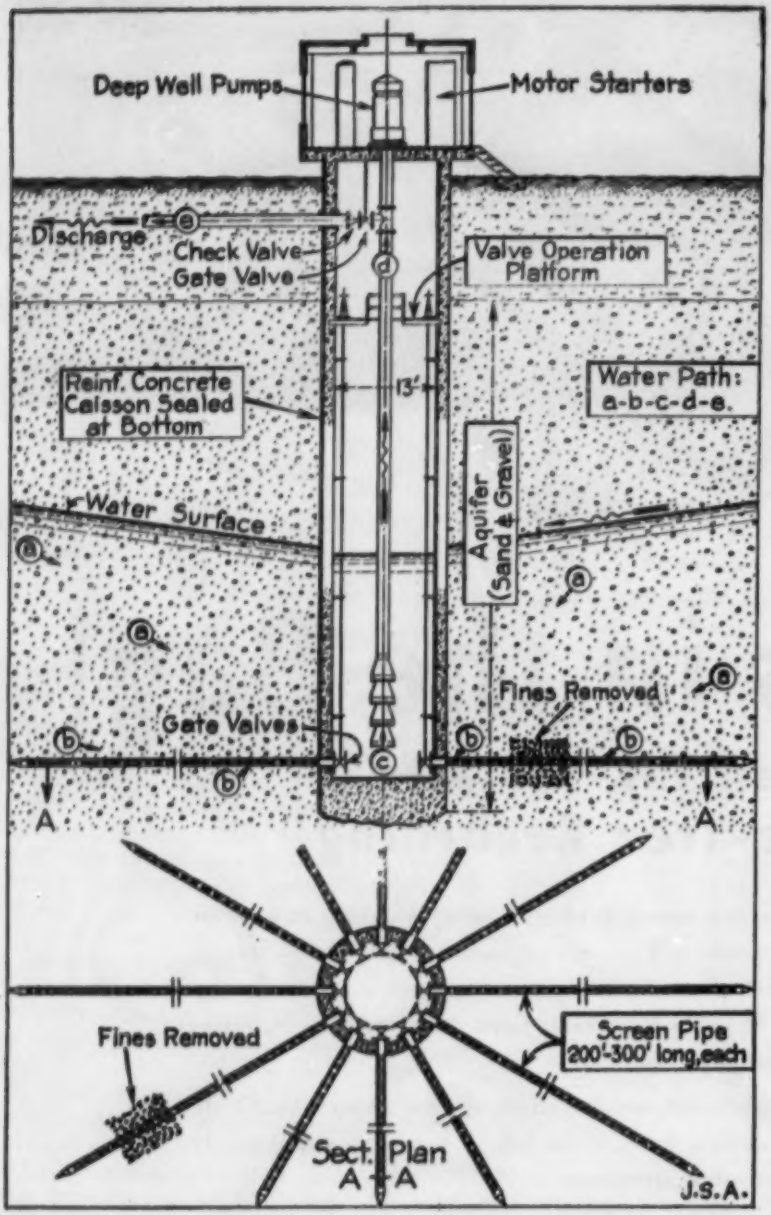


Fig. 3. Water pit system for small supplies.

type pump will give the highest efficiency.

Pumping from intake into mains without secondary pumping requires that the discharge head on the intake pumps be sufficient to provide for the highest head demand in the plant. Such an arrangement is not economical in power usage. With this type of system secondary screening must either be done with strainers under pressure or with fine screens ahead of the pumps.

From Intake to Canals

If canals are used for water distribution and secondary pumping is done according to local requirements, then the intake pumps will be the low head type. The secondary screening may be done after the pumps under a gravity flow condition. Where large quantities of water are handled and the ultimate use is at a wide range of heads, this type of system will prove to be economical.

In this type of system chlorine is used at the intake discharge and secondary chlorination is done at local points if found necessary. Objections to the canal type of system are that it is difficult to enlarge and that the ultimate capacity should be provided for in the original construction. It is not difficult to extend the length of such a system.

The pumps, the arrangement of the pumps, and the duty on the pumps are all items to be given due consideration in intake design. Some of the specific points to study follow:

(a) Use moderate specific speeds.
(b) Shafts should be moderately stressed.
(c) Shafts should not operate at or near the critical speed.
(d) Pumps should operate within an area of stable points on the performance curve.
(e) Use water sealed stuffing boxes.
(f) Exercise more than ordinary care in design and engineering to prevent cavitation.
(g) Design pump station so that turbulence, air entrainment and vortices do not exist at pump inlet.
(h) Use the proper metals in pump construction.

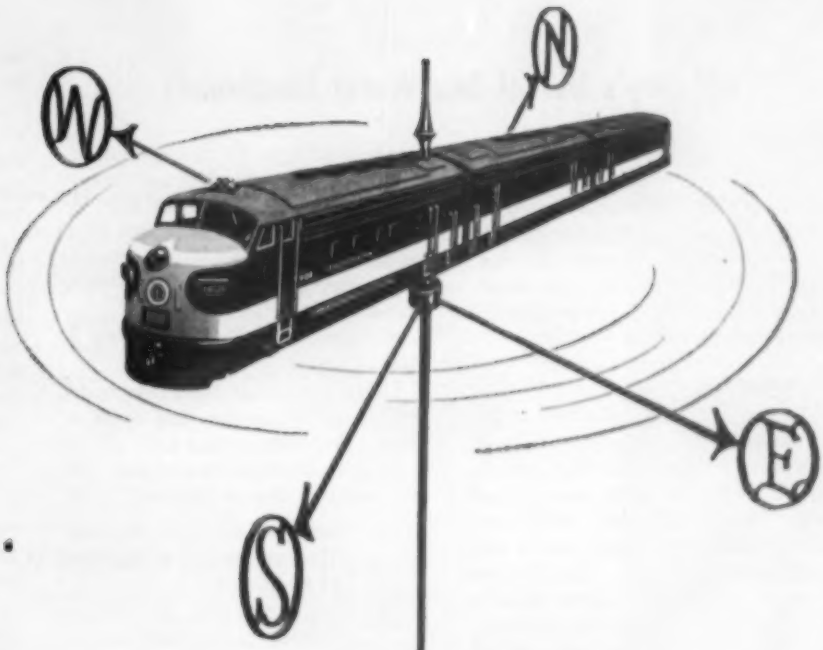
The principal difficulties with sea water pumps will usually be due to cavitation, corrosion, erosion, or galvanic action which involve some uncertain or controversial factors, but the first seven items given above can be engineered with a fair degree of certainty and thus reduce the pump-trouble problems to Item (h).

SECONDARY HANDLING

Screening at secondary or main distribution intakes may be done with either the roller-towel type of screen or with the rotary drum type. The rotary drum type may be installed in a very shallow pit with a consequent reduction in cost of structure (Fig. 3). In this service maintenance of the rotary type is less than the roller-towel type.

The secondary screens should be six mesh 0.047 wire, which will remove practically all of the shell

(*Continued on page* 76)



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Industry's Use of Sea Water (continued)

particles, crab claws, and small fish. Very small and microscopic sea life will pass this screen and should be killed by means of chlorine dosage. Uniform and continuous chlorination is more satisfactory than periodic dosage and exposed metals will suffer less corrosion.

Distribution

Low pressure distribution of sea water is usually done by means of flumes or canals. For best results the flumes should be constructed with permanent side walls and floor. Sheet steel piling and a concrete floor will give excellent results if the piling is protected with an asphalt base coating and with a system of anodes for cathodic protection.

In such a flume with a width to depth ratio of two, the head losses can be sufficient to avoid more than a small amount of heat pick-up enroute. Six foot per second velocity will not give a serious head loss but it does not allow for capacity expansion.

Piping

Steel pipe is in general use for sea water distribution systems. Concrete pipe can be used for large lines but it cannot be acid cleaned without damage to the concrete. Polyvinyl chloride and other plastic materials should be adequate for small lines in many cases.

Steel pipe in sizes down to 20 in. can be lined with bitumastic enamel, welded, and the joints lined all in a manner so that sea water cannot come in contact with the steel.

Lines which are too small for a man to enter and coat the welded areas should be flanged or assembled with sliding coupling. When pipe is in 40-foot lengths and expertly lined, bolted joints are reasonable in first cost; and maintenance is low if the line is properly coated. This type of bitumastic enamel lined pipe can be acidized for cleaning and it will have a C factor of 140 to 150 when in constant use.

Saran lined pipe is available in sizes from 1 in. through 6 in. with screwed fittings to and including 2 in. and flanged fittings either steel or cast iron in sizes 2½ in. through 6 in. Systems of pipe properly assembled and lined with Saran may be considered to be permanent as far as inside corrosion is considered. Rubber lined pipe is also available in similar forms.

There are many other forms of linings on the market and some of them have been successful.

Factors involved in the pipe lining problem are as follows:

(1) Temperature limit on most lining materials is between 150 and 200 F.
(2) Can the lining be applied properly in the field?
(3) Can lines be tapped for additional connections after original construction is completed?
(4) Provisions for expansion and contraction of lines without damage to lining.
(5) Can lining be acidized?
(6) Can welded joints be coated inside?
(7) Is the lining a permanent protection against sea water corrosion?
(8) Does the lining attract or repel the forms of life normally found in sea water?
(9) What does it cost?

No matter how much care is exercised in screening and chlorination, some adherence and growth of barnacles and oysters may be expected in sea water lines. Since most of the hard material is calcium carbonate, acid treatment will clean the lines effectively and rapidly. Where convenient, reversal of flow using comparatively hot water will usually kill off such forms of life but this method must be used frequently to prevent reduction in flow characteristics of the pipe. Systems should be designed so that valves can be operated frequently to determine the condition of the valve and to dislodge build-up of calcareous growth.

On large valves 12 in. and up, an all iron valve is probably the most economical. Bronze trim valves are used but the loss of iron near the seats will often cause disc rings to be dislodged and the valve inoperable. Solid bronze discs will help this problem. Such valves should be examined for maintenance annually or more frequently if practical. Valves in lined pipe lose iron from galvanic action faster than in bare pipe.

Small sized valves are usualiy all bronze, all rubber, or monel according to the conditions of velocity and temperature.

Bronze or monel valves in an unlined steel pipeline will cause the pipe to fail at points close to the valve. The diaphragm or Saunders type of valve in sizes up to 4 in. is very good for sea water service where pressures permit, and these valves are available with many kinds of linings.

Part 2 of this discussion will deal with use of sea water in industrial equipment.

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Articles from maintenance and production men in Southern and Southwestern plants are preferred. Material must not have appeared elsewhere nor been sent to another publication.

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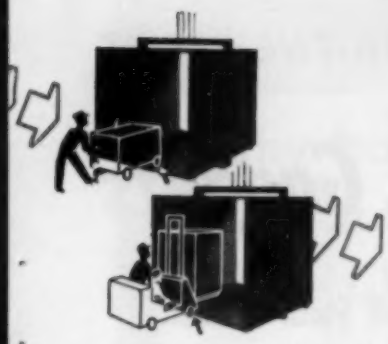

power trucks change the picture

It's necessary to change your thinking about freight elevators when you change from hand truck to power truck loading. A hand truck weighs about 500 pounds. Its relatively small pay loads are pulled into the elevator and distributed by hand. Full car loading is gradual. And the extra weight of the hand truck is unimportant. This type of traffic is easily handled by a conventional freight elevator. However, power truck loading completely changes this picture. A power truck may weigh 8,000 pounds, or more, plus its heavier pay load. It travels fast and stops quickly. Obviously, this type of traffic can be handled safely only in freight elevators and hoistways that have been specifically designed to take power truck "punishment"—as described in detail in Otis Heavy Duty Freight Elevators booklet B-705.

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Otis Light Duty freight elevators have a semi self-supporting framework that permits installation in new and existing hoistways without reinforcing the building, or adding overhead supports, or building a penthouse. They can be used for any rise up to 35 feet at a speed of 25 feet per minute with lifting capacities of 1,500, 2,000 and 2,500 pounds. They're described in Otis booklet B-720.

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Otis engineers have developed a screen of safeguards around freight elevator entrances. A modern Otis freight elevator cannot be started until all car and hoistway doors are closed, and none of them can be opened while the car is moving through the hoistway. Doors can be opened only at a landing where the car is leveling or stopped. Power-operated Otis Hoistway Doors, for new or modernized installations, are described in booklet A-389.

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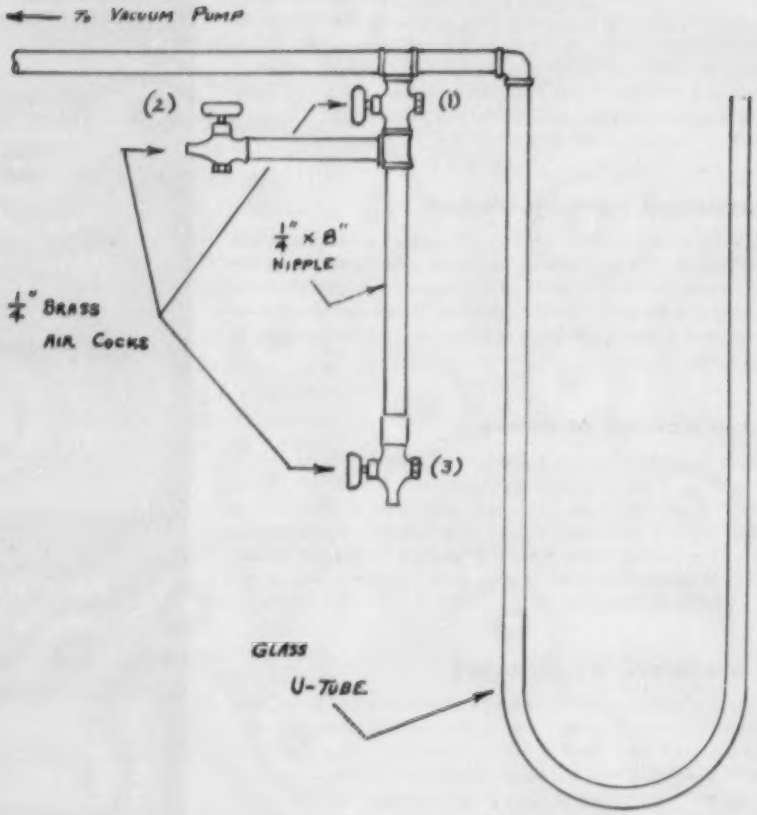


Drain for Manometers

DURING winter months accumulations of condensate in manometers on vacuum line service resulted in erroneous readings, which necessitated frequent cleaning and drying of the U-tubes. Recurrent expense for dismantling the manometers to remove accumulations of water and gasoline involved labor, glass breakage, and spillage of mercury.

This problem was corrected by adding a condensate-trap to the piping system on the vacuum side of the manometers, as indicated in the drawing.

During normal operation the side cock (2) and the bottom cock (3) are closed and the upper cock (1) opened, so liquids moving through the horizontal line are drained into the nipple. To drain the reservoir, the upper cock (1) is closed and the lower cock (3) is opened. Draining the reservoir was improved after the coupling on the upper end of the reservoir nipple was replaced with a tee and a horizontal brass cock (2) in the side outlet. Since opening this cock vents the top of the reservoir to the atmosphere, equalizing pressures hasten gravity drainage of the trap.

By G. W. CHISM, Phillips Petroleum Company, Smackover, Arkansas.

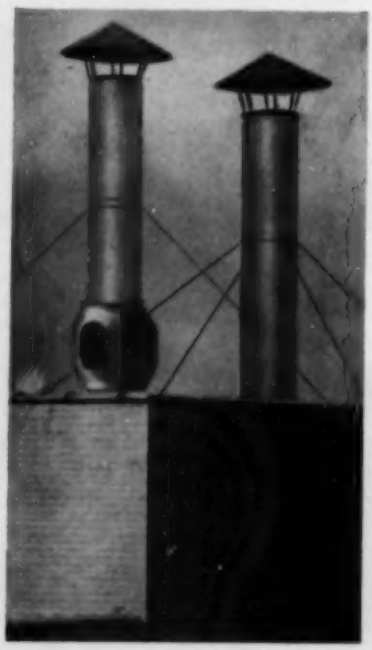
Tall Stack Prohibited

Draft Provided by Bifurcate Fan Units

THE Socony-Vacuum oil blending and packaging plant, because it is located near the Kansas City Airport, was prohibited from erecting a tall stack for boiler draft. Yet the plant requires two 150 hp boilers to provide steam for plant processes, tank car cleaning and barrel cleaning.

Socony-Vacuum engineers solved the problem with two DeBothezat Induced Draft Bifurcator Fans. One fan is mounted in the breeching immediately above the boiler. The other fan is mounted on the roof because of limited space above the boiler smoke outlet.

It is reported that these units are providing adequate draft for the two boilers and require only 12-ft steel stub stacks. Flue gases



Why buy small high-pressure valves that lack these CRANE features?

New 1500 and 2500 pound check patterns . . . screwed or socket welding ends; ½" to 2". Patented construction assures high disc lift, free flow and minimum pressure drop.

1500 and 2500 pound globe patterns . . . screwed or socket welding ends; ½" to 2".

1500 and 2500 pound angle patterns . . . screwed or socket welding ends; ½" to 2".

When you buy CRANE Lip-Seal Bonnet Valves . . . designed exclusively for high pressure/high temperature power plant service . . . you are assured of:

- lip-seal welds that are laid on flat surfaces—needn't be chipped out or burned out;
- easy dismantling and reassembly—bonnet screws out after weld is *ground away*—makes inside of valves entirely accessible;
- bonnet threads are chrome plated to prevent galling or seizing;
- stems that do not bind or gall—because of CRANE's exclusive ball-joint glands;
- easy access to stuffing box—swing-type gland eye-bolts swing free of yoke area, can't be lost;
- a more rigid swivel disc-stem connection that minimizes vibration;
- each size valve is a separate design for proper proportion—another CRANE exclusive.

Specify "Crane Lip-Seal" when you want small valves for high pressure/high temperature steam service. For more reasons why you should do so, ask your CRANE representative for Circular AD1902, or write direct. CRANE CO., General Offices: 836 S. Michigan Ave., Chicago 5, Ill. Branches and Wholesalers Serving All Industrial Areas.

CRANE CO.

VALVES • FITTINGS • PIPE
KITCHENS • PLUMBING • HEATING

CRANE'S FIRST CENTURY...1855-1955

do not harm the fan motors, as this type of fan is constructed with the motor located in an isolated chamber.

The Induced unit is a motor driven axial-flow fan in a divided housing. The motor is in an isolated chamber around which flue gases are by-passed (bifurcated) so that the motor always remains clean, easily accessible and well within safe temperature limitations. The fan unit at left in the photo [on page 78] supports the stub stack.

Cover for Regulators

FREQUENT shut-down of engines operating out-of-doors occurred during rain storms as a result of water finding access into the atmospheric vents on the side of Ensign Model "B" fuel-gas regulators.

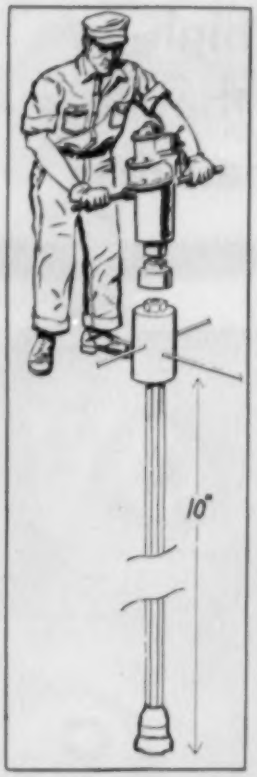
The vent filter element, which consists of two discs of fine-mesh screen with an inner layer of felt, had to be removed and dried before the engine could be restarted.

The trouble was corrected by removing the filter and screwing a ⅛-inch by 1½-inch standard nipple into the side of the regulators. On the other end of the nipple, a 90-degree elbow was connected with the open end turned so that the filter faced downward, thus protecting the screens and felt from water entry.

By W. C. WEST, Phillips Petroleum Company, Eureka, Kansas.

Impactool Subtracts 39 Manhours from Job

DURING a major overhaul of a steam turbine, a Texas power company had to remove and replace 16 nuts on 1¾" diameter studs holding a throttle valve cover on the main steam line to the



turbine. The valve was located below the floor and had to be removed with a 10 foot extension with several cross bars for the men to push on. It took 10 men four hours to do the work.

When a size 588 Ingersoll-Rand Air Impactool was put on the job, the work required three men and took 20 minutes, effecting a clear saving of 39 manhours. At $1.50 per hour, labor savings attributed to the "Slugger" Impactool amounted to $58.50 on the 20-minute job, and 3 hours and 40 minutes down time was saved.

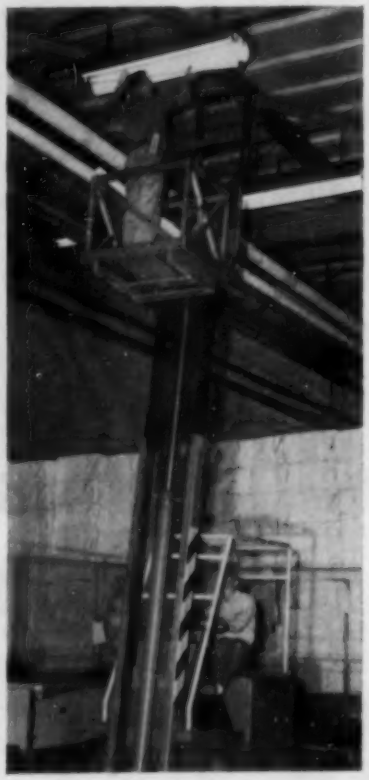
Shaft Wobble Eliminated

WOBBLE in the long lay-shaft which drives the oil pump, magneto, and other auxiliaries on a Clark 230 hp engine, caused excessive wear in the lay-shaft gears, coupling, and pins. Several methods were tried to correct this situation with only partial results.

Now the shaft is supported at mid-point by a "Fafnir" self-aligning bearing mounted on a bracket bolted to the bed plate.

The wobble of the engine lay-shafts has been almost entirely eliminated. Although this idea will not eliminate all maintenance on the lay-shaft, it is estimated that it will double the life of the gears and shaft coupling.

By C. W. GRAVITT, Phillips Petroleum Co., Phillips, Texas.

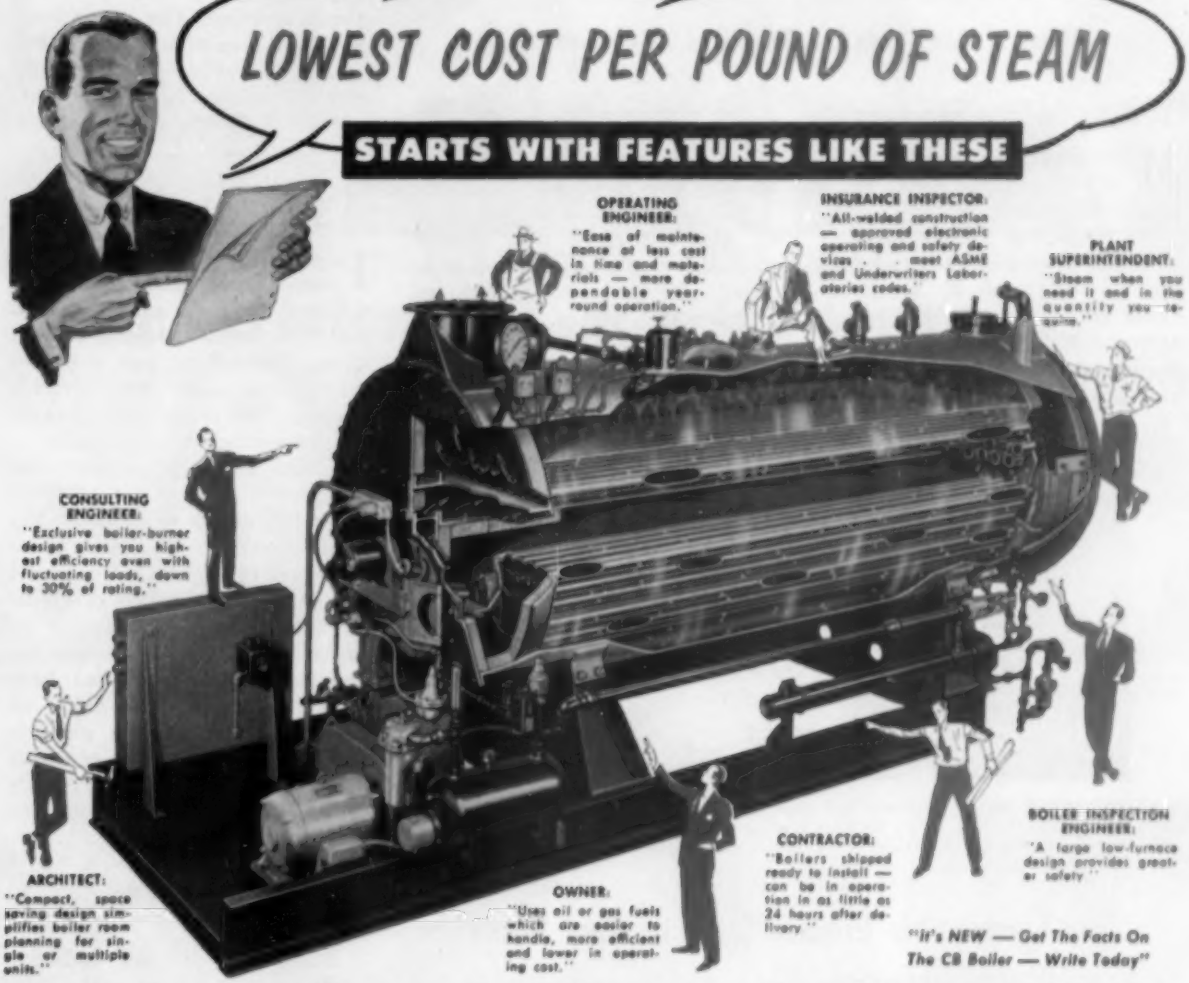


Double Duty Fork Truck

AT THE Jesup, Georgia, Division mill of Rayonier, Incorporated, Fred B. Oleson, electrician, utilizes a high-lift fork truck for various electrical maintenance jobs. He is shown here replacing ceiling lamps. The safety pallet was constructed by the plant maintenance department.

LOWEST COST PER POUND OF STEAM

STARTS WITH FEATURES LIKE THESE



"It's NEW — Get The Facts On The CB Boiler — Write Today"

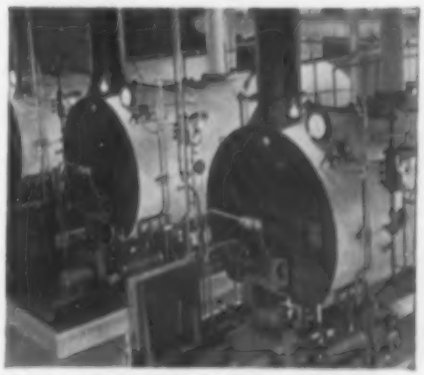
that's why you profit most from Cleaver-Brooks self-contained boilers

• Top to bottom, inside and out, you get more money-saving features when you specify or buy Cleaver-Brooks self-contained boilers. You make an *investment in quality* that pays off in lowest net cost per pound of steam for processing or heating.

YOU BENEFIT from more than 20 years of experience, working closely with men who have made it their business to be *right* about boilers. You profit from complete coordination throughout planning, installing, supervising and final operation.

YOU BENEFIT from self-contained design and original four-pass construction. These Cleaver-Brooks engineered "firsts," plus forced draft, 5 sq. ft. of heating surface per boiler hp, and exclusive burners, all contribute to highest heat transfer. Guaranteed 80% thermal efficiency when firing with oil is the direct result!

Whether you're planning a new steam plant or modernizing, make certain you get the complete Cleaver-Brooks story before you buy. See your Cleaver-Brooks representative, or write for catalog AD-100. Cleaver-Brooks Company, Dept. K, 305 East Keefe Avenue, Milwaukee 12, Wisconsin, U.S.A. *Cable Address CLEBRO — Milwaukee — All Codes.*



One typical owner can count on yearly savings ($15,000 fuel and $10,000 labor) from this battery of three 150 hp Cleaver-Brooks self-contained boilers.

•

NOW — FIRST SIZES OF THE CB BOILER ARE MADE IN CANADA, TOO.

•

Cleaver Brooks

ORIGINATORS OF THE SELF-CONTAINED BOILER

BOILERS . . . STEAM OR HOT WATER . . . FOR HEATING OR PROCESSING, IN SIZES FROM 15 TO 500 hp, 15 to 250 PSI.

Testing Safety Showers

MOST insurance carriers insist on the installation of a proper number of safety showers about operations using acids such as dyeing operations, where leaching is performed, or in plants using the acid treatment to remove scale from iron stock prior to painting, enameling, or processing in other operations.

Galvanized piping is suggested to eliminate rust and the probability of clogging the orifices in the sprinkler head.

The heads should be placed on 60 day test check and checked to make sure that everything is in order. To prevent spillage on floors while testing, use a bag made of light rubber or one of the many new chemical sheetings that can be readily cemented or stitched with a new electronic sewing machine. The bag is fastened to a hoop with a swivel handle attached. This gets it up and over the shower head with ease.

By PAUL C. ZIEMKE, Oak Ridge, Tenn.

The bulk of precast concrete roof deck installations are in the South. The 150,000 sq ft of deck on this Southern finishing plant offers reduced maintenance, speed of installation, resistance to moisture and chemicals, durability and reduced insurance costs.

Non-Combustible Precast Concrete Roof Decks

THE South's fastest growing industries are among the largest users of precast concrete roof deck, according to a survey recently reported to SPI, which discloses the increasing popularity of this structural material throughout the country.

The survey showed that a total of approximately 44,000,000 sq ft of this non-combustible roof deck was installed on textile and paper mills, public utility buildings and United States Government buildings during the mid-century decade ending last December. The bulk of these installations were located in the South.

In addition, Southern food processing and packing, petroleum, chemical, and metalworking plants, as well as large service establishments were liberally represented as precast concrete roof deck users.

The survey disclosed that a grand total of almost 203,000,000 sq ft of this roof deck—enough to pave a 200 ft wide highway from Atlanta to Savannah—was installed nationally on more than 8,000 major structures of all kinds during the ten-year period. Some 6,063 owners were represented.

This square footage was supplied by nine firms—including three in the South — who together manufacture more than 80% of all precast concrete roof deck. The southern companies were Arnold Stone Co., Greensboro, N. C.; Concrete Products, Inc., Brunswick, Ga., and Alabama Cement Tile Co., Birmingham.

Among the prominent reasons cited by architects, engineers and owners for specifying precast roof deck were reduced maintenance, ease and speed of installation, fire resistance, durability, reduced insurance cost and economical first cost.

Other reasons for preference included improved appearance of structures, lower cost than poured roof, savings in time, and structural reasons. In several industries where specialized plant conditions influence roof design, the precast concrete deck was chosen to eliminate roof deterioration in moisture-laden rooms, to provide a non-metallic roof deck, and to blend with modernistically designed structures.

Screens Last Longer

IN my cooling tower outlet I had trouble keeping screens in the discharge opening on the return line. Due to the chemicals used, it was difficult to find a screen that would stand the corrosive effect and electrolysis set up; and, too, vortexing was a problem. I took care of it in the following manner:

I built a frame of redwood that would cover the discharge opening from the cooling tower and cut long slender pieces of single strength glass ½ in. wide and inserted these in slots cut into the framing ½ in. apart and have used the screen now going on three years. Since the glass is flat, it directs the flow of water directly into the sump and greatly reduces the vortexing of the water.

By WM. E. GEORGE, Temple, Tex.

Sweating of Air Lines During Cool Months

WE have had considerable trouble in our plants from both high- and low-pressure air lines sweating during the cool months. This has been eliminated by installing a valve-controlled small line around the after coolers, with just enough warm air in the system to raise the temperature of the air to about the same as the room temperature. In warm weather, the valve on the by-pass may be closed.

It has not been found advisable to raise the temperature in the after coolers because most modern after cooler tubes and gaskets in the output end may be damaged.

We have several 19 x 13 machines with a 2 in. bypass around the coolers which have operated quite satisfactorily during the past winter.

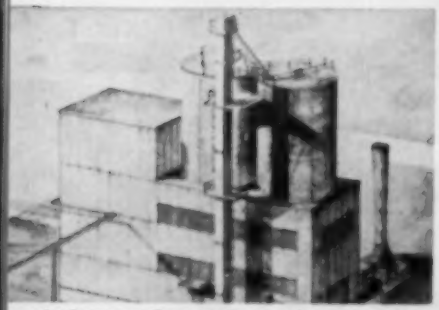
By a MAINTENANCE SUPERINTENDENT

DUPONT'S Barksdale, Wis. Works saves $7,000 a year with new automatic combustion controls.

HUDSON MOTORS' modernized plant in Detroit saves $480,000 a year—cuts powerhouse labor 27%.

SYRACUSE UNIVERSITY, N. Y., built a completely new unit for maximum economy and dependability.

For efficiency... for economy...



AT STAUFFER CHEMICAL'S new plant in Louisville, Ky., total cost of steam is only 60¢ per 1,000 lbs.

Coal costs 29.6% less than next cheapest fuel at ADDRESSOGRAPH-MULTIGRAPH'S plant in Cleveland.

MOTOR PRODUCTS CORP. of Detroit, Michigan, saves $54,000 a year with modernized installation.

more and more firms

Burning coal the modern way saves PENNSYLVANIA RAILROAD'S, Ft. Wayne, Ind. terminal $33,000 a year.

Efficient new equipment reduces labor and improves performance records for LIGGETT & MYERS at Richmond, Va.

At LAKEWOOD HOSPITAL, in Lakewood, Ohio, new automatic coal burning facilities cut fuel costs 22%.

UPJOHN'S new Kalamazoo, Mich. plant is clean and efficient with no dust or smoke nuisances.

are burning coal the modern way

Chicago's ultra-modern PRUDENTIAL BUILDING has fully automatic coal handling and burning system.

GOODYEAR saves $3,000 a day with new coal-burning installation at Akron, Ohio.

facts you should know about coal

- In most industrial areas, bituminous coal is the lowest-cost fuel available.
- Up-to-date coal burning equipment can give you 10% to 40% more steam per dollar.
- Automatic coal and ash handling systems can cut your labor cost to a minimum.
- Coal is the safest fuel to store and use. No dust or smoke problems when coal is burned with modern equipment.
- Between America's vast coal reserves and mechanized coal production methods, you can count on coal being plentiful and its price remaining stable.

For further information or additional case histories showing how other plants have saved money burning coal, write to the address below.

NATIONAL COAL ASSOCIATION
Southern Building, Washington 5, D. C.

M. W. KELLOGG FLEXIBILITY ANALYSIS TECHNIQUES KEEP PACE

Increasingly high pressures and temperatures in central power stations call for increasingly accurate determination of the stresses and reactions of main and reheat piping. Thorough flexibility analysis eliminates the necessity of providing an excessive safety factor by overdesigning. This means shorter pipe runs—which decrease capital investment and increase operating efficiency.

M. W. Kellogg's special stress analysis group employs two basic techniques: (1) The general analytical method, involving development and solution of the requisite simultaneous equations for determining forces and moments in the piping system—calculated either manually or by an electronic computer; and (2) the unique Kellogg Piping Model Tester—which accurately simulates the operation of the most intricate piping systems under temperature.

The stress analysis group, originally formed in 1932, has become an integral function for many of M. W. Kellogg's power piping customers. The group is also available on a consulting basis. A recent booklet describes in detail Kellogg's various techniques for piping flexibility analysis. Copies are available on request.

1. GENERAL ANALYTICAL SOLUTION—MANUALLY OR BY ELECTRONIC COMPUTER

2. THE UNIQUE KELLOGG PIPING MODEL TESTER

FABRICATED PRODUCTS DIVISION
THE M. W. KELLOGG COMPANY, 225 BROADWAY, NEW YORK 7, N. Y.
The Canadian Kellogg Company, Ltd., Toronto • Kellogg International Corporation, London
SUBSIDIARIES OF PULLMAN INCORPORATED

POWER PIPING—THE VITAL LINK

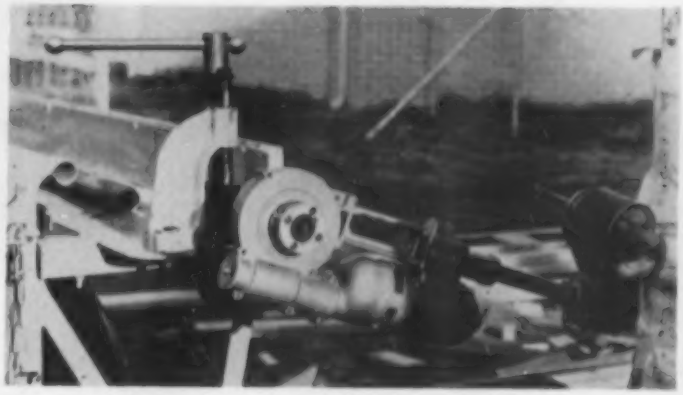
Equipment . . Supplies . . Methods

FOR FREE INFORMATION—Circle code number on pages 16 & 17

Portable Power Pipe Threader

J-1 VELOCITY POWER TOOL COMPANY, 201 N. Braddock Avenue, Pittsburgh, Pa., is marketing the new Lawco Junior Portable Power Pipe Threader. Adapers and speed reducer make it possible to handle pipe from ¼ in. up to 10 in.

Operation is as follows: Apply the threading dies to the Lawco tool, position the tool, then press a button and the power unit drives the cutting dies. The tool can also be used as an auger for boring post holes, driving bolts and nuts, opening valves and as a hoist for weights up to 500 lb.



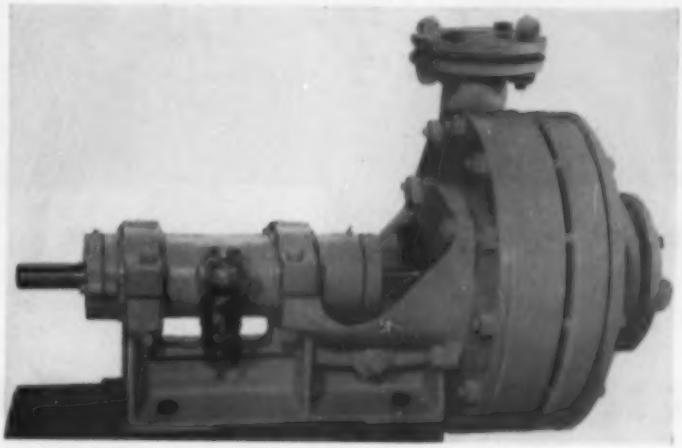
Velocity Power Tool Co.'s portable power pipe threader.

Plastic Centrifugal Pump

J-2 MISSION MANUFACTURING COMPANY, Box 4209, Houston 14, Texas, is marketing its Type D, solid plastic centrifugal pump which will withstand highly corrosive conditions.

Fluid end of this pump is solid plastic, not simply lined or coated. Chemical resistance exists throughout instead of being confined to a thin surface layer. The plastic—"Haveg"—is exceptionally resistant to most acids, bases, and salts, to chlorine, and to many solvents and other chemicals excepting those of a highly oxidizing nature.

Centrifugal pump can be used continuously at temperature ranges to 265 F. Capacities to 325 gpm, heads to 158 ft. 2 in. discharge, 3-in. suction, one size only. The Mission Haveg pump is available for use where no alloy is entirely suitable.



Mission Manufacturing's plastic (Haveg) centrifugal pump.

For more data circle item code number on the postage free post card—p. 17

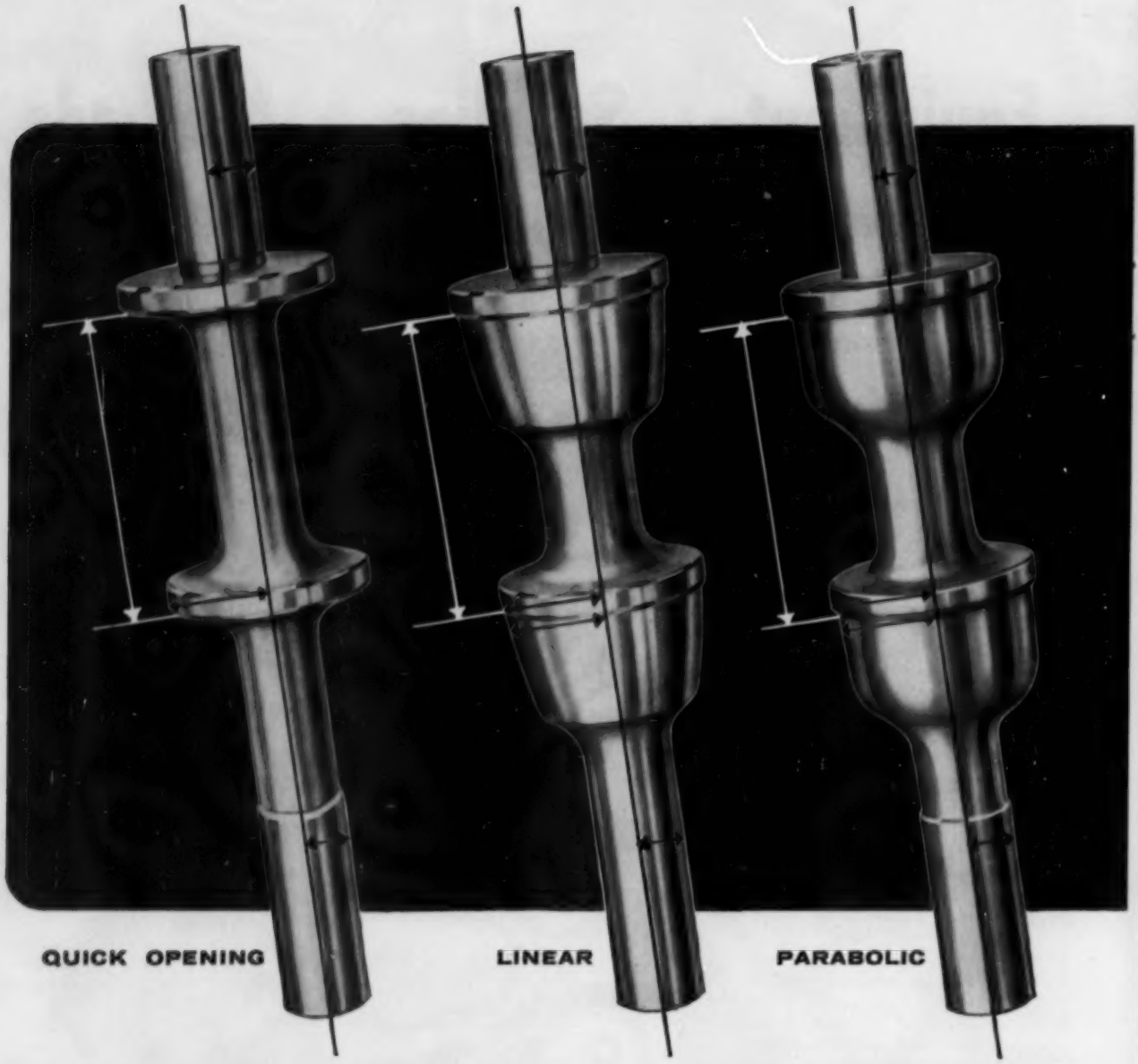
Complete Line of Plastic Solvent Welding Pipe Fittings

J-3 TUBE TURNS PLASTICS, INC., 224 East Broadway, Louisville 1, Ky., has introduced a complete line of solvent welding pipe fittings and flanges of injection molded unplasticized polyvinyl chloride.

These fittings are in addition to the company's complete line of threaded fittings, now widely used in piping systems in the chemical, food, drug, petroleum, paper, textile and other industries where corrosion is a serious problem. Both lines now include 90° and 45° elbows, tees, unions, couplings, caps, reducing bushings and flanges.

These solvent welding fittings are recommended where installations are of a permanent nature; the threaded type is recommended where disassembly, revamping or revising of the systems may be required.

More Items—Page 88

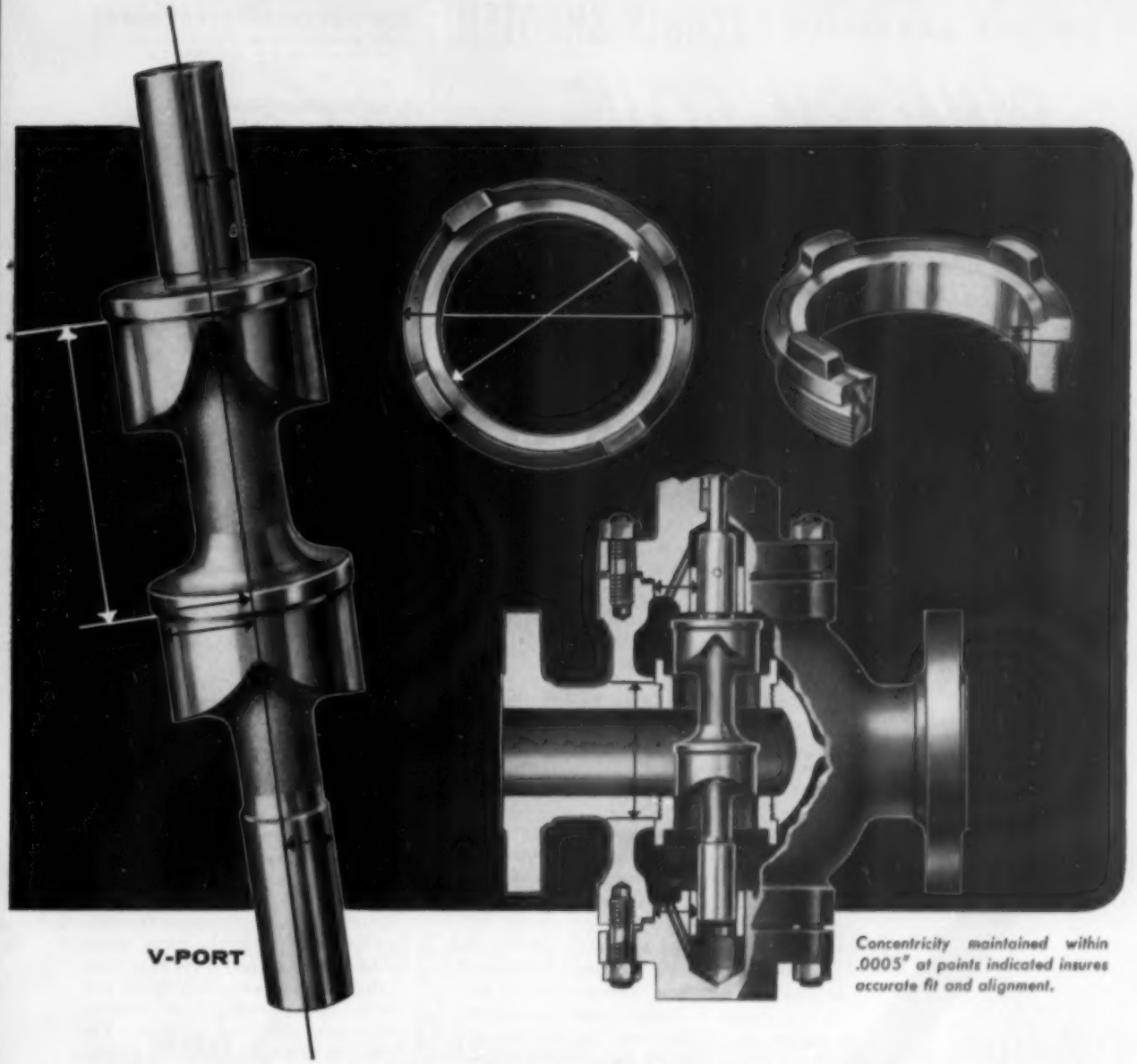


INTERCHANGEABLE PARTS

An Important Factor in Uniform Quality of Masoneilan Control Valves

You have a right to expect to be able to install replacement parts without recourse to a machine shop for custom fitting. When you use Masoneilan Control Valves you *get* parts that fit. For Mason-Neilan precision methods, automatic machines and specially designed tools and gages, plus rigorous inspection, eliminate the maintenance man's headaches and reduce costly time out of service.

By maintaining this precise uniformity, Mason-Neilan makes certain that every valve will be in perfect alignment and that any



V-PORT

Concentricity maintained within .0005" at points indicated insures accurate fit and alignment.

parts you may install later will also be in perfect alignment.

Moreover, because valve plugs of comparable size but different flow characteristics are interchangeable, conversion is a comparatively simple operation.

These quality features, added to other outstanding qualities of Masoneilan Control Valves, offer you low *cost* at comparable *price* — and over-all cost not price is the valid comparison.

Investigate the practical advantages of Masoneilan Control Valves. Write for complete data.

MASONEILAN

MASON-NEILAN REGULATOR CO.

1206 ADAMS STREET, BOSTON 24, MASS., U. S. A.

Sales Offices or Distributors in the Following Cities: New York • Syracuse • Chicago • St. Louis • Tulsa
Philadelphia • Houston • Pittsburgh • Atlanta • Cleveland • Cincinnati • Detroit • San Francisco
Boise • Louisville • Salt Lake City • El Paso • Albuquerque • Odessa • Charlotte • Los Angeles
Corpus Christi • Denver • Appleton • Birmingham • New Orleans • Dallas • Seattle
Mason-Neilan Regulator Co., Ltd., Montreal and Toronto

new equipment (continued)

For more data circle item code number on the postage free post card — p. 17

Band Welder Offers Several Economies

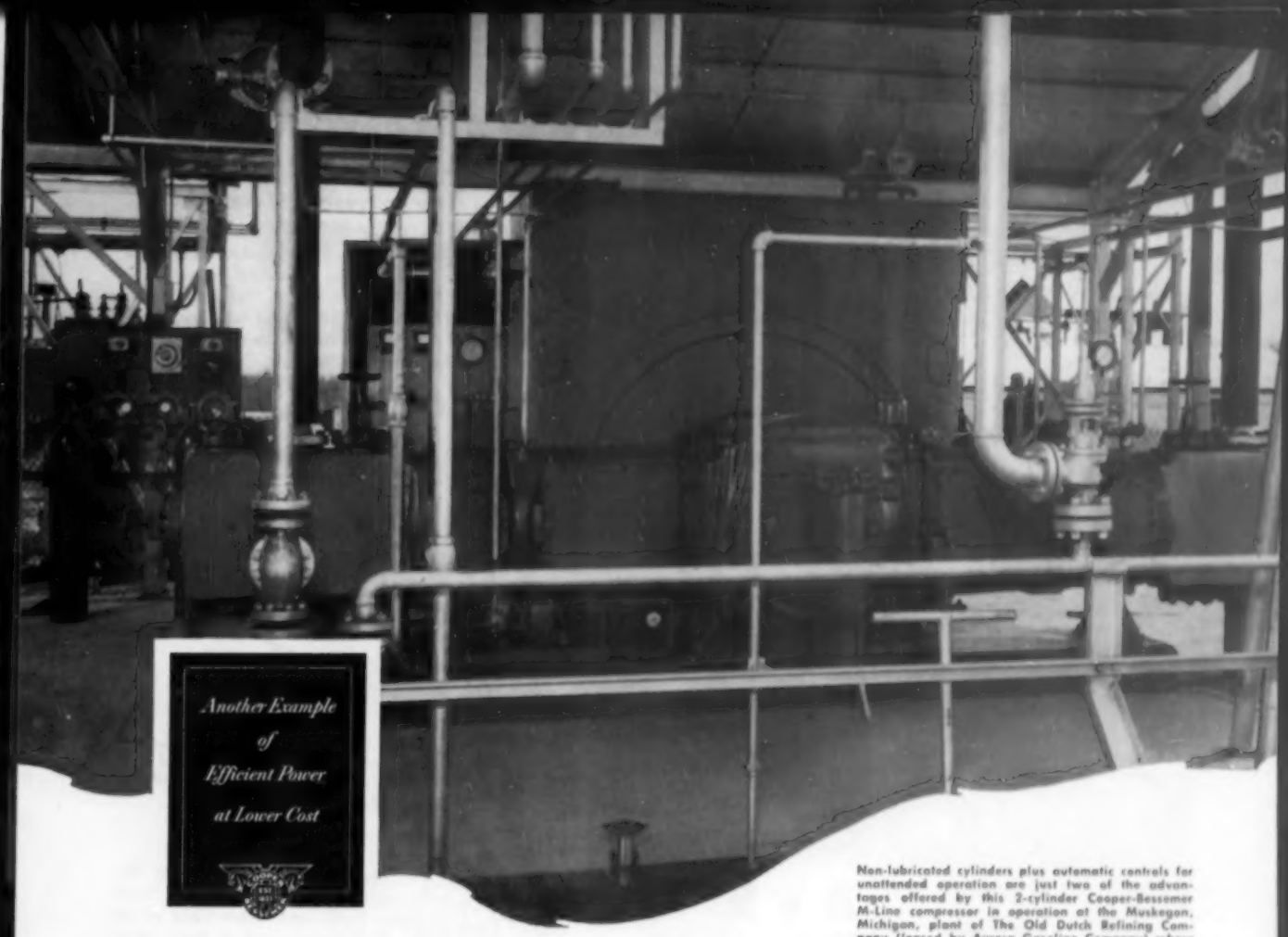
J-4 KRAFT EQUIPMENT COMPANY, INC., Southeastern Shipyards, Savannah, Ga., is marketing the Thomas Band Welder—a new tool for installing face wires and their retainer bands on cylindrical filter screens, washers and deckers.

Complete mechanism of the Band Welder is enclosed in a two piece non-conducting Fiberglas case—an important safety feature considering the wet conditions found in and around areas where cylindrical type filters and screens are used.

The tool welds the face wire seam and also spot welds the two ends of the band together, creating a joint that has a tensile strength equal to that of the band. Automatic cycle control assures uniform welds consistently. It also eliminates the danger of overheating the band which could be detrimental to the face wire.

Big operating advantage of the tool (over conventional silver brazing techniques) is saving in time. The Band Welder does a job of joining the face wire and also the six to nine bands required for holding the average face wire in position in less than 60 seconds per band. The normal time required for this operation, using the silver brazing method, will average 2 to 3 hours.

Light weight unit (less than 25 lb) also eliminates the time consuming operation of moving (to the job location) heavy equipment such as an oxy-acetylene outfit or electric welding machine. Old bands can be reused indefinitely, simply by adding another short piece and welding together. The millwright installing the face wire can, without special training, join the face wire and the retainer bands together with this tool. Unit operates on any 110-volt, 60 cycle outlet.



Non-lubricated cylinders plus automatic controls for unattended operation are just two of the advantages offered by this 2-cylinder Cooper-Bessemer M-Line compressor in operation at the Muskegon, Michigan, plant of The Old Dutch Refining Company (leased by Aurora Gasoline Company) where the UOP Platforming process is in use.

"HYDROGEN COMPRESSES CLEAN"

... with Cooper-Bessemer's non-lubricated cylinders

RECYCLING millions of cubic feet of hydrogen a day for the UOP Platforming of low-octane gasoline, demands continuing efficiency from a smooth working compressor that will not contaminate the recycle hydrogen. That is one of the reasons why The Old Dutch Refining Company, leased by Aurora Gasoline Company, recently installed a 2-cyclinder Cooper-Bessemer FM compressor in their modern plant in Muskegon, Michigan.

To avoid contaminating hydrogen with oil in the recycle gas, Cooper-Bessemer successfully developed a non-lubricated compressor cylinder.

Operating against micro-smooth hardened cylinder liners, these 8" diameter carbon pistons require no lubrication whatever. With a mirror finish, the cylinder bores reveal no excessive wear.

No matter how exacting or complex your compressor problems, check the advantages offered by Cooper-Bessemer M-Line compressors. For dependability and money-saving operation, you can rely on Cooper-Bessemer — one of America's oldest engine builders offering the latest in engineering advancements.

MOUNT VERNON, OHIO

COOPER-BESSEMER

GROVE CITY, PENNA.

New York City • Seattle, Wash. • Bradford, Pa. • Chicago, Ill. Houston, Dallas, Greggton, Pampa and Odessa, Texas Washington, D. C. • Shreveport, La. • San Francisco, Los Angeles, Calif. • St. Louis, Mo. • Gloucester, Mass. • New Orleans, La. • Tulsa, Okla. • Cooper-Bessemer of Canada Ltd., Edmonton, Alberta—Halifax, Nova Scotia.

DIESELS • GAS ENGINES • GAS-DIESELS • ENGINE-DRIVEN AND MOTOR-DRIVEN COMPRESSORS

new equipment (continued)

For more data circle item code number on the postage free post card — p. 17

Thermodynamic Steam Trap

J-5 SARCO COMPANY, INC., Empire State Bldg., New York 1, N. Y., has added the Type TD-50 to their line of Thermodynamic steam traps introduced late last year. The new trap can be used on any pressure from 10-600 psi.

Exploded view of the Sarco TD-50 Thermodynamic steam trap which consists of only three parts: body, screw to cap, and the valve head.

The manufacturer claims that the trap operates equally well on light or heavy loads and closes tight on no load. It operates against back pressures up to 50% of the inlet pressure. The manufacturer emphasizes that it is not an impulse trap. It does not use flash steam to operate. It uses the kinetic energy of steam to close the valve.

Stainless steel construction and design virtually eliminate maintenance. Only operating part is the valve head, a solid stainless steel disc.

Coating Galvanized Surfaces Without Etching Treatment

J-6 RUST-OLEUM CORPORATION, 2425 Oakton St., Evanston, Ill., has introduced the "Galvinoleum" products, which make it possible to coat new, old, previously painted, or partially rusted galvanized surfaces in a choice of colors without etching or weathering.

On new galvanized surfaces, especially those which are to be fabricated into parts, etc., it is only necessary to remove any grease or oil before coating with Galvinoleum. Old galvanized metal surfaces should be cleaned to remove dirt, grease, and foreign matter before coating. On partially-

AT NEW LONE STAR STATION

REPUBLIC Automatic Combustion Control

Handles Rapid Load Changes and Selective Firing of Fuels

The speed and versatility of modern electronics are bringing fast control response, easy operation and flexibility in fuel firing to Southwestern Gas and Electric's new central station near Lone Star, Texas. Placed on the line this spring, the 54,000 KW plant incorporates many of the latest ideas in power plant design, including a Republic Automatic Combustion Control System with Telemaster Electronic master control.

Lone Star Station, Lone Star, Texas
Southwestern Gas and Electric Company
Sargent and Lundy, Engineers

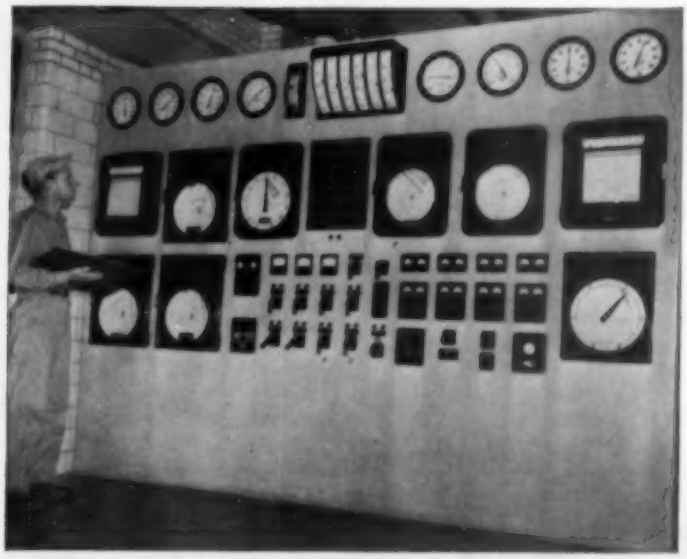
The plant is arranged to fire both natural and coke oven gas. Automatic fuel selector controls provide for four firing combinations:

- #1 Automatic preferential control of coke oven gas in accordance with its availability, with sequential make-up of natural gas.
- #2 Manual control of the coke oven gas proportion, with sequential make-up of natural gas.
- #3 Block or adjusted constant flow of natural gas with coke oven gas make-up.
- #4 Block, or adjusted constant flow of coke oven gas, with natural gas make-up.

Extremely fast load changes are common at the Lone Star plant. Immediate control response is possible, however, because the system uses a new type load control to get the earliest indication of a load change and provide the initial impulse for controlling fuel and air to the boiler. Electronic impulses to positioners and regulators eliminate transmission lags—enable control equipment to make immediate compensations for changing loads. Steam pressure control is also possible if desired.

According to Mr. John Turk, Chief Engineer, the electronic control system is extremely simple to operate. Operators regularly run the plant on automatic between maximum capability and a minimum load of 15,000 KW, although wide range automatic operation was not planned when the control system was designed. The three-element Republic feedwater control in the plant is left on automatic to essentially zero load.

For more complete details about Republic Combustion Controls, write for Data Book S-13.



Electronic master controls at this panel provide for either steam pressure or steam pressure–load control, manual setting of fuel-air ratio, fuel valves, draft fans, and selection of one of four firing methods.

REPUBLIC FLOW METERS CO.
2240 Diversey Parkway, Chicago 47, Illinois

new equipment (continued)

For more data circle item code number on the postage free post card — p. 17

rusted galvanized surfaces, the rust spots should be scraped and wire-brushed to remove rust scale and loose rust, and "spot-primed" with Galvinoleum Number 1225 Red. If the surface has been previously painted, it is important to remove loose and flaking old paint prior to coating with Galvinoleum.

Furnished at brush consistency, the products may be applied by brush or spray, and should be thinned 10-15% with Rust-Oleum 540 Thinning Oil for spray application. Galvinoleum Red and Green will dry to touch in 4-8 hours and the Metallic and Gray in 8-12 hours.

Drilling Machine

J-7 CINCINNATI LATHE AND TOOL CO., Cincinnati 9, Ohio, has developed the new 16" Royal Model LE drilling machine especially suitable for production, tool room maintenance and general purpose duty. Single spindle bench and floor models, and single and multiple spindle production bench models are available.

Rated at ½ in. capacity in cast iron with an 1800 rpm motor, the machines are equipped with 0 to ½ in. capacity chuck mounted on a taper plug spindle. They are shipped complete with electrical controls including overload protection, motor mount, vee belt, pulleys for spindle and motor, and contour-fitting belt guard as standard equipment.

GOING PLACES *down on the farm with Cities Service...*

The mechanized farm equipment, vehicles, and heating units that make life easier for America's farm families... all depend heavily on Cities Service quality petroleum products.

CITIES SERVICE
A Growth Company

Number 12 of a series

new equipment (continued)

For more data circle item code number on the postage free post card — p. 17

Electric Chain Hoist

J-8 CHISHOLM-MOORE HOIST DIVISION, COLUMBUS MCKINNON CHAIN CORP., Tonawanda, N. Y., has introduced an electric chain hoist designed to serve for its normal life without costly maintenance or interruptions in work schedules.

Known as the "CM Lodestar," the new hoist features shock-proof push button control, sealed-in lifetime lubrication, self-adjusting heavy duty brake, overload protection, fully enclosed and protected components, safety limit switches, light weight, and extremely compact size and low headroom.

A unique jam-proof chain guide and non-kinking flexible link "CM-Alloy" chain permit the Lodestar to be used for extreme angle pulling. The single phase model (without contactor) can be used for side pulling. It can also be used upside down for odd jobs where it is inconvenient to install a hoist overhead. Used this way, the Lodestar "lifts itself with the load."

Interchangeable suspensions are another interesting Lodestar feature. All swivel or rigid hooks and lugs, and adapters are interchangeable on all models.

The Lodestar is available in capacities from ⅛ to 1 ton for operation on single phase 115 volt and 3 phase 208-220/440 volt 60 cycle power. The 3 phase models are factory wired for 220 and 440 volts and can be converted from one to the other in minutes. The ¼ ton model weighs only 51 pounds. Prices start at $149.50.

Announcing

Carey Fire-Chex

PERMA-TOPP ROOFING

Perma-Topp being applied over wood deck after removal of old roofing. The 1st ply has been applied and 2nd ply is being started.

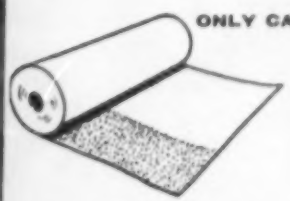
Here, the 2nd ply is being completed.

The totally NEW kind of built-up roofing that combines BEAUTY with greater TOUGHNESS and FIRE-SAFETY than ever before possible!

No longer must the appearance of industrial and commercial buildings be spoiled by dull, drab, built-up roofing. Fire-Chex Perma-Topp makes it possible for even buildings with saw-tooth or domed roof construction to have built-up roofing that's architecturally beautiful, colorful, heat-reflective! What's more, Perma-Topp lasts longer, provides greater protection against fire, weather and corrosive fumes.

Carey Fire-Chex Perma-Topp Roofing contains a patented formulation, developed after extensive laboratory and field testing. It stays tough, resilient, even through continuous exposure to sizzling temperatures (up to 185° F.) that dry out the vital oils in **ordinary** roofing causing disintegration, cracking, failure. Moreover, it has the Underwriters' Laboratories, Inc. Class B rating.

Perma-Topp's slate granule surface provides colorful beauty — with heat reflective properties when the lighter colors are specified — and never needs resurfacing. Thus coating maintenance costs are eliminated. Perma-Topp will not "slide," is ideal for saw-tooth or dome roofs. The coupon below will bring you complete specification details on Carey Fire-Chex Perma-Topp Roofing and, if you wish, the personal services of a Carey Roofing Engineer without obligation to you.



For the utmost in Fire-Safety, Fire-Chex Perma-Topp Roofing should be installed with the now famous Fire-Chex Vapor Barrier

ONLY CAREY FIRE-CHEX PERMA-TOPP ROOFING OFFERS ALL THESE ADVANTAGES:

- Beauty never available before
- Ability to withstand high temperatures
- Fire-Chex patented formulation
- Never needs coating
- Never needs resurfacing
- Will not slide
- Class B fire safety rating
- Three plies
- Can be installed on hip and ridge roofs with less than 4" pitch

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diversified products for industry, farm and home since 1873

The Philip Carey Mfg. Company
Lockland, Cincinnati 15, Ohio
In Canada: The Philip Carey Co., Ltd., Montreal 3, P. Q.

CLIP AND MAIL TODAY!

The Philip Carey Mfg. Company Dept. SPI-9
Lockland, Cincinnati 15, Ohio

☐ Please send specifications and details on new **FIRE-CHEX PERMA-TOPP ROOFING.**

☐ Please have a Carey Industrial Engineer call.

Name_____

Firm_____

Address_____

City_____ Zone_____ State_____

new equipment (continued)

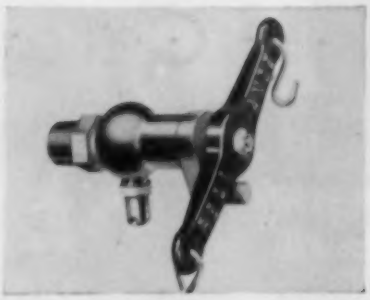
For more data circle item code number on the postage free post card—p. 17

New Model Gage Cock

J-9 RELIANCE GAUGE COLUMN COMPANY, 5902 Carnegie Ave., Cleveland 3, Ohio, announces a new model gage cock designed for pressures up to 450 psi.

The device operates by chains and lever to rotate a multiple thread (quick-closing) stem. Positive closing is obtained by a steady pull on the right-hand chain. An integral stop prevents lever from swinging to dead center on the open position. Internally the cock has stainless cone valve ground to microscopic glass-smooth finish and a monel metal seat. Mounting of cone in stem is such that floating action is provided, assuring positive seating. Both cone and seat are renewable.

Body of the cock is of high grade bronze. Steel operating lever features an internal sprocket arrangement giving choice of 18 non-slipping positions for selection of best lever location. Discharge nozzle is adjustable



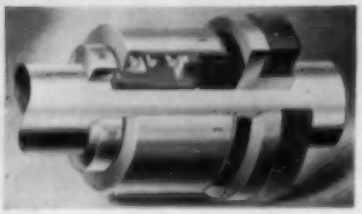
to direct steam and water away from operator or into a drip funnel. The new gage cock is said to be similar in many ways to the Reliance forged steel cock.

For more data circle item code number on the postage free post card — p. 17

Mechanical Seal

J-10 THE GARLOCK PACKING COMPANY, Palmyra, New York, has announced a new mechanical seal, specifically designed for use on rotary shafts at pressures up to 150 psi.

Known as the Garlock BB-21A Mechanipak Seal, it is furnished completely assembled, ready to install. Standard construction includes brass shell, brass washer, and Buna-N bellows. Seals are available for shafts from ⅝" to 3" diameters.



Buna-N or neoprene bellows are furnished for operating temperatures up to 212 F. and pressures up to 150 psi. Silicone bellows are provided for temperatures up to 400 F. where pressures do not exceed 50 psi.

Garlock BB-21A seals are designed for use on rotary shafts of various types of equipment such as centrifugal pumps, gear boxes, speed reducers, and agitators.

According to the company, these mechanical seals provide these money-saving benefits: (1) Eliminate wear on shafts and shaft sleeves (2) Eliminate fluid leakage (3) Reduce downtime (4) Cut maintenance costs.

NEW

Subscription

order form

ORDER FORM

SOUTHERN POWER & INDUSTRY

Please enter my subscription to Southern Power & Industry for:

☐ $2.00 for Three Years

☐ $1.00 for One Year

I am enclosing payment ☐

Bill me ☐ Bill my Company ☐

NAME .....

STREET .....

CITY OR TOWN .....

ZONE ... STATE .....

POSITION .....

COMPANY NAME .....

KIND OF BUSINESS .....

was Rome burned *up!*

Not the city, mind you, for this was before the days of the Nero caper, but the people — they wanted water. Summers were getting hotter and Romans were getting thirstier. They needed something to drink — with or without calories. Thus began the construction of Rome's famous aqueducts, one of which, scarred but faithful, served the city for almost nine hundred years!

These early aqueduct builders had more to contend with than their thirst. For one thing, they had to carry the ball alone. No skilled specialists or professional consultants stood ready to provide their answers. Today, carrying the ball alone is almost as defunct as the aqueducts themselves. Experienced consulting, design and operating engineers — each contributing his unique skills — cooperate in solving complex water and waste problems that would have amazed the early Romans. Graver believes this interrelation is not only useful but desirable and that all involved can not help but profit by it.

GRAVER

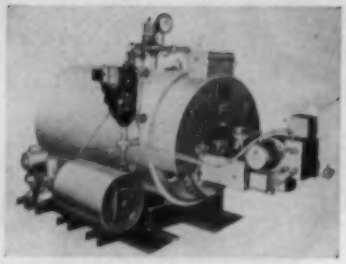
GRAVER WATER CONDITIONING CO.

new equipment (continued)

For more data circle item code number on the postage free post card—p. 17

Scotch Marine Package Boiler

J-11 WILLIAMS & DAVIS BOILER & WELDING CO., INC., 2527 Canton St., Dallas, Texas, announce a complete one-piece Scotch Marine package boiler featuring compact design, quick installation, fast steaming, portability, and low maintenance.



The "W & D" complete one-piece Scotch Marine package boiler.

Only five connections are necessary —gas, stack, electric, steam and water. Unit, designed for 100 lb steam working pressure, can be used by all industries requiring steam for heating, power or processing.

General description and detailed specifications are outlined in the company's bulletin No. 1054. Also available on request are 125 and 150 lb steam working pressure units.

Magnetic Drill Press

J-12 LUPEAR'S TOOL & DIE CO., 32681 Northwestern Hwy., Farmington 4, Mich., has introduced a lightweight, portable, magnetic drill press with drilling speed and accuracy equal to a conventional drill press.

Called "Portomag," the tool locks in place by means of a powerful magnetic base which permits the operator to drill at will without physical strain. The drill is taken to the work instead of the work to the drill.

Three models are available for use with standard heavy duty drills of ⅝, ⅞ and 1¼ inch bit capacities. By incorporating a reversing switch, tapping up to 1 inch capacity can be accomplished.

A magnet control switch has four positions: Low, for positioning drill bit to punch mark location; medium and high, for holding while drilling; and a demagnetize position. It clings securely even if the electric current is disconnected. It will only release when set to demagnetize. A convenient built-in light serves as a spotlight for locating bit and as a signal light to indicate on and off condition of the magnet base.

The magnetic base action is powerful enough to withstand a direct pull of from 1,000 lb for the small unit to 2,000 lb for the largest. Permissible pressures at drill bits range from 500 lb to 1,200 lb.

Compact 40 hp Steam Generator

J-13 CYCLOTHERM DIVISION, NATIONAL U. S. RADIATOR CORP., Oswego 6, New York, has designed a new 40 hp steam generator that is only 83 in. long, 57 in. high and 36 in. wide at the skids. The generator incorporates all the latest safety devices and maintains an efficiency of 80% or better.

The unit delivers 1380 lb/hr and the btu output is 1,340,000 btu per hour. Standard design pressures are available from 15 to 200 psi. The new 40 hp boiler burns oil, gas or a combination of oil and gas.

Battery Changing in Georgia Plant

(*Starts page 56*)

conducted by the Industrial Engineering Department to determine the most efficient battery capacities and voltages and this resulted in a decrease from six sizes then in use, to three sizes.

Each size is distinguished by a band of color painted on the upper rim. This permits the battery man to tell at a glance in which section of the racks he will find a replacement. This one improvement alone has saved us money by reducing the number of sizes required. In effect, it provides us with a substantial pool to draw from but at the same time reduces the total number of batteries in service.

You might classify this procedure as standardization. Undoubtedly many plants have grouped battery sizes in some similar fashion, but those that have not done so may find an idea here that will be an advantage in purchasing the correct size of battery. This program has greatly simplified our battery handling and control and it will permit a smaller battery stock to supply the same number of operating trucks.

The battery shop is divided into two sections, each served by half of the motor generator sets. Each section has its own overhead traveling crane and separate power sources.

The great number of battery changes per shift, about 80 to 100,

leaves very little leeway for crane or electrical failures. Because of past experiences that have left everyone standing about with a helpless feeling while trucks piled up and telephones rang, everything possible has been done to eliminate even remote possibilities of shutdowns.

We know that our material handling equipment is vital to production as "down time is dollar time" and we practice preventive maintenance up and down the line to avoid any possible stoppage or slow down.

Operating Without Spare Boiler

(*Starts page* 58)

heated water. Temperature is automatically controlled, but the rate of refill after drawdown is hand controlled.

The boiler operator, by observation of a recording level indicator, can instantly determine the quantity of water in the tanks, and by remote control valves, control the inflow, which determines the steam load for water heating.

Therefore, with the tanks full at the start of the day shift, when steam demands are greatest, he can control the top one-third of the boiler capacity by reducing or cutting off entirely the water inflow to the tanks. Then when there is capacity of boiler available he can begin to replace the tank drawdown proportioned to available boiler capacity. In this way it has been possible to provide a daily load factor on boilers approaching 100%.

Plans were eventually made to bring the steam generating equipment into balance with the processing apparatus, giving the plant an additional 60,000 lb/hr unit, bringing the total capacity to 125,000 lb/hr. However, it is expected that the same methods of preventive maintenance and wide awake operating practice will be continued, and that the load control methods will be supplemented by automatic devices that will reduce the operator attention and allow greater attendance to other operating details.

News (continued)

(Starts page 10)

U. S. Hoffman Purchases Dallas, Texas, Fabricator

THE UNITED STATES HOFFMAN MACHINERY CORPORATION has purchased the INTERCONTINENTAL MANUFACTURING COMPANY, INC., of Dallas, Texas.

U. S. Hoffman manufactures textile maintenance equipment, pneumatic conveying systems, centrifugal blowers and exhausters, oil filtration units, metal finishing and ordnance equipment. It also operates several ordnance plants.

Purchase of Intercontinental was made in keeping with the company's planned program for expansion and diversification of its sales and manufacturing activities, according to Hyman Marcus, company president.

Intercontinental manufactures tractors, farm implements, buses, motor coaches and industrial equipment and machinery in addition to aircraft components.

The Texas company operates two plants. Its main plant in GARLAND is five miles northeast of Dallas and occupies 180,000 sq ft of floor space on a 23-acre tract. Its Brady, Texas plant has a manufacturing area of 200,000 sq ft. It is located on 324 acres of land along with Intercontinental's privately owned Curtis airport.

Johns-Manville Will Build Savannah, Georgia, Plant

JOHNS-MANVILLE CORPORATION will build an asphalt roofing plant and warehouse near SAVANNAH, GEORGIA, with production expected by early Fall, 1956. More than 100 people will be employed at Savannah with an annual payroll of $400,000.

Located on a 58-acre tract one mile north of the city of Savannah, plant buildings will cover more than 100,000 sq ft of floor space. Johns-Manville will produce there its nationally-known line of asphalt roofing products and will warehouse a number of asbestos-cement building products for distribution in the southeast.

The Savannah operation will be the twenty-third Johns-Manville plant in the United States and Canada and the company's eleventh building products plant in this country.

Completely Self-Contained Turbo-Mobile Power Plant Develops 5500 KW of Emergency Power

CLARK BROS. CO., Division of Dresser Operations, Inc., have designed and constructed the Clark TURBO MOBILE POWER PLANT. This unit, which was built for the Navy, supplies a large block of power for emergency use.

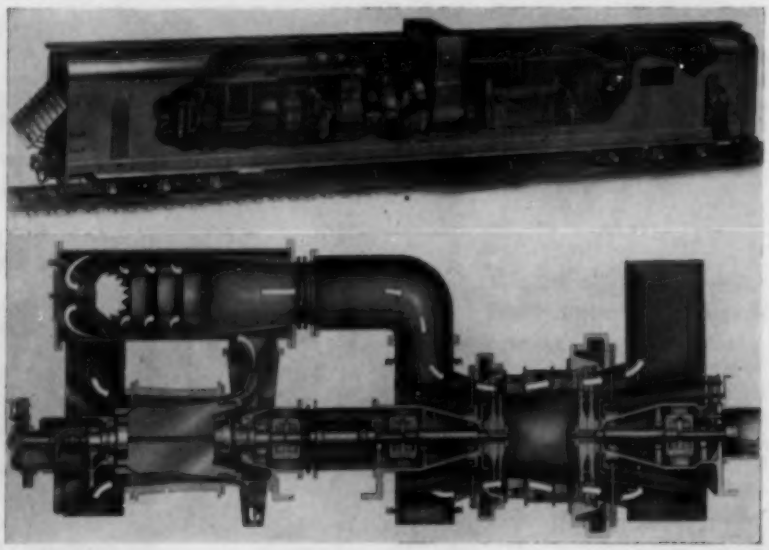
Plant is a complete self-contained 5500 kw power plant rated at 80 F ambient temperature up to an altitude of 1000 ft. The prime mover is a simple, open cycle, dual shaft, series flow gas turbine direct driving a two pole synchronous generator. The complete plant with auxiliaries, controls, fuel storage and handling, auxiliary engine driven generator, station switchgear is mounted on one rail car. Connection to the fuel supply and transmission lines are the only external connections required.

The gas turbine power plant is designed specifically as a compact, mobile source of a large amount of electrical power which can be used if an emergency should occur. Even though it is an emergency unit, the power plant is of heavy duty design and can be operated continuously no matter what the duration of the emergency may be. It does not require water and may be moved and placed in operation in hours. The units can be operated by one man and, if necessary, could be remotely controlled.

Applications in Industries Cited by Clark

The gas turbine used to drive the generator in the turbo-mobile power plant is equally well suited to the drive of centrifugal compressors in the refining, gas transmission, process and general industry. It is specifically designed for continuous, long-life operation either with or without regeneration.

The oil, gas and chemical industries have widely accepted centrifugal compressors during the past five years. This has been, in a large measure, due to the availability of a dependable, economical turbine driver.



CUTAWAY shows the Clark Turbo Mobile Power Plant mounted in specially designed railway car. Starting at the left is the diesel engine used to start the unit, gas turbine, generator, exciter, fuel pumps and control room.

SIMPLIFIED cross section shows flow of air and gas through gas turbines. Air enters axial compressor at lower left. The thirteen stage unit discharges air into combustion chamber at upper left where it is mixed with either liquid or gaseous fuel and burned. Hot gases enter the high pressure turbine, center, which turns this turbine and also turns axial compressor connected to it. Next, hot gases enter low pressure turbine, right, which is connected to the load. Gas discharges thru roof of car.

UNIT is started by a diesel which is connected to extension shaft of the axial through a torque converter and clutch. As soon as diesel has brought the axial up to a high enough speed to furnish sufficient air for combustion, the diesel disengages and unit is self-sustaining.

Turbo-Mobile Power Plant

(Continued)

The steam turbine has been the driver chiefly used in the oil and chemical plants. It can be integrated into the process, making an efficient, flexible driver. It may also be matched to the individual compressor horsepower and speed requirements at a reasonable cost. This situation is not, however, true on gas transmission lines where there are no process requirements and water is generally difficult to secure. While steam turbines have been used on gas transmission pipe lines to drive centrifugal compressors, they have not received general acceptance because of water and maintenance requirements.

Gas Turbine Use Expanding

The gas turbine does not require water. Therefore, this objection to a gas turbine on a gas transmission line is eliminated. A number of gas turbines are being proven in this service today. Successful operation of these plants heralds the use of gas turbines in the process industries.

The gas turbine as presently conceived lacks the range of horsepower ratings for the diversified requirements of the process industry. Fortunately, pipe line stations involve large blocks of power. The available gas turbine rating is divided into this power figure in order to secure the number of duplicate machines needed. The compressor builder is then required to design a compressor to match the needs of the transmission line and the driver manufacturer.

The process industries can not do this. The greater complexity of the multi-stage compressor requirements and plain economics dictate another answer.

A refinery, a steel mill, a natural gasoline plant, etc., has a multitude of horsepower and speed requirements. For instance, 15,000 hp on a pipe line is simply two or three similar gas turbines. It may be split 10,000 and 5,000 hp; or 7,000, 5,000 and 3,000 hp in a refinery. There is little duplication possible.

For these process applications, Clark Bros. offers a different type of gas turbine. This unit can be quite easily matched to the specific requirements of the application. The unit involves a gas generator consisting of an axial compressor, single combustion chamber and a turbine. It provides a source of gas at 1100 F or less, which is supplied to one or more separate output turbines.

The output turbines are similar in

design to the flow turbines being used in nitric acid plants today. These units operate at relatively low temperatures and stresses. As a consequence, the costly aspects of a turbine are eliminated. The rotor construction, bolting, and blade root design are simplified. Either axial or high efficiency radial flow turbines may be used.

Future trends to reheat may be accommodated. Once proven in continuous year in and out service. the gas turbine will be widely integrated into processes where mechanical drives, air and steam are required.

E. L. MacDonald Retires From Kansas City Power and Light

After 50 years in the utility business, 14 years with the Commonwealth Edison Co., Chicago, and 36 years with the Kansas City Power and Light Co. in the capacity of results engineer, production department, E. L. MACDONALD recently retired. In past years Mr. MacDonald was very active in A.S.M.E. affairs having been chairman of the Kansas City section, a member of Power Test Code No. 4, chairman of the sub-committee that published the "Heat Loss" method of boiler testing, and author of many papers on this and other engineering subjects.

New Ownership for Navco

Frederick W. Richmond, New York industrialist, and Henry E. Haller, Sr., president of NATIONAL VALVE AND MANUFACTURING CO. of Pittsburgh, have jointly announced the sale of the power and industrial piping firm to Mr. Richmond and a group of investors. The purchase price was between 4½ and 5 million dollars.

National Valve, popularly known as Navco, is the nation's third largest fabricator and erector of power piping systems for utilities, chemical plants and many other industries.

"I am pleased to report that present management will continue," Mr. Richmond said in a statement, "and will carry on an accelerated program of expansion. The company-paid pension plan and the bonus program for Navco employees will be continued unchanged."

Amer. Safety Razor Corp. Plant Completed—Virginia

A single story AMERICAN SAFETY RAZOR CORP. million-dollar manufacturing plant in STAUNTON, VA. was completed in June, according to the Richmond office of Daniel Construction Co.

To be tied in with the corporation's other plants in Canada and England, the modern brick and glass block structure will house machinery for fabricating small metal parts. An ASR official listed the trade names of products that will be manufactured here: Gem Razors and Blades, Pal Injectomatic Razors and Injector, Double and Single Edge Blades, Star Single and Double Edge Blades, etc.

Work on the project began Nov. 1 under supervision of the south's largest general industrial contractor. Space in the totally enclosed plant was listed as 300,000 sq ft, of which 30,000 sq ft was allotted for offices.

Gilliam Now Texas Repr. for Automatic

Appointment of JOHN GILLIAM EQUIPMENT COMPANY as its franchise representative for the entire state of Texas was announced recently by the AUTOMATIC TRANSPORTATION COMPANY. The firm, which has sales and service facilities in Dallas, Houston, and Fort Worth, formerly represented Automatic in northern Texas only.

The new arrangement puts HARRISON DURRETT in charge of Gilliam sales and service in HOUSTON, with offices located at 1923 Kohlfahl St. JOHN GILLIAM is supervising the company's DALLAS operation, with headquarters at 1307 Dragon St., and J. HUGH JOHNSON remains in charge at FORT WORTH, with offices located at 708 Hemphill. Complete facilities, including sales, service, and parts are available at all locations.

J. F. Pritchard—Memphis

The C. J. GASKELL COMPANY, INC., of MEMPHIS, TENNESSEE, has been named sales representative for western Tennessee, southwestern Kentucky, northern Mississippi, northeastern Arkansas and southeastern Missouri by J. F. Pritchard and Company of California, Kansas City, Missouri, manufacturer of cooling towers, for air conditioning and industrial applications, and Pritchard "Hydryers," packaged dehydration units for drying air or other gases.

Kerbey Elected President of Midwest Piping—St. Louis

ERIC A. KERBEY was recently elected president of MIDWEST PIPING COMPANY, INC., St. Louis, Mo. Kerbey has been with the company since 1928 when he established the Chicago sales office. A year later he was made eastern manager. In 1942 he transferred to St. Louis where he has been executive vice-president for the last eleven years.

A. G. STOUGHTON, who has been president of Midwest since its formation, will continue as chairman of the board and chairman of the executive committee.

Midwest fabricates and erects piping systems and manufactures welding fittings. Plants are located in St. Louis, Boston, Los Angeles and Passaic, N. J.

Fisher Governor Acquires Thermo Instruments Co.

FISHER GOVERNOR COMPANY, Marshalltown, Iowa, has acquired the assets of Thermo Instruments Company, Belmont, California, manufacturers of capacitance probe type liquid level measurement instruments. D. M. Comb, former president of Thermo, is now associated with Fisher Governor Company in Marshalltown.

National Aniline Expanding Moundsville, W. Va., Works

THE GIRDLER COMPANY, Louisville, Ky., has been awarded a contract by NATIONAL ANILINE DIVISION of Allied Chemical and Dye Corporation to design and erect a combination hydrogen and carbon monoxide manufacturing plant at the company's MOUNDSVILLE, WEST VA. works. Girdler is a division of the National Cylinder Gas Company, Chicago.

The carbon monoxide and high purity hydrogen will be employed in organic synthesis at the Moundsville chemical plant.

News (continued)

Dampney Company Appoints Four New Southern Agents

THE DAMPNEY COMPANY, Hyde Park, Boston 36, Massachusetts, manufacturer of industrial protective coatings for specified corrosion-control requirements, announces extension of its Southern representation with appointments of agents at Charlotte, Atlanta, Shreveport and Winter Haven.

E. L. MOUNTCASTLE, 2617 Selwyn Avenue, CHARLOTTE, has extended his representation of major industrial equipment in North and South Carolina to include Dampney protection for metal in power and processing service.

SPOTSWOOD PARKER AND COMPANY, 313 Techwood Drive, ATLANTA, engineering sales organization specializing in heating, ventilating and power plant equipment is the newly appointed Dampney representative for the State of Georgia.

HINES F. VAUGHAN, 922 Kirby Place, SHREVEPORT, has been appointed to apply the combined experience of his own background and that of The Dampney Company to the corrosion problems associated with high-temperature refinery and other industrial operations in the Gulf Coast area.

GEORGE L. SIMONDS COMPANY, sales agency for refractory, insulating and other materials for power plant and industrial use, is the new Dampney representative for the State of FLORIDA, with headquarters at Fifth Street, S. W., Winter Haven. Dampney is also represented directly in the Pensacola area through George L. Simonds Company's branch manager, Russell A. McMillan, Post Office Box 984, Pensacola.

High Speed Bar & Rod Mill for Atlantic Steel—Georgia

Construction work is underway on the ATLANTIC STEEL COMPANY'S new $8,737,000 merchant bar and rod mill at Atlanta, Georgia. Completion of the mill is scheduled for September, 1956.

As general contractor for construction of the new mill, THE RUST ENGINEERING COMPANY will design and erect both the mill building and warehouse building and will install all mill machinery, auxiliary equipment, and utilities. The reheating furnace for the new mill will be designed and installed by the Rust Furnace Company, and electrical installation work handled by Allegheny Industrial Electrical Company, Inc., both subsidiaries of The Rust Engineering Company.

Designed to be one of the fastest combination mills in the world, it will have a speed of 5,000 fpm on rods, and a production rate of 80 to 90 tons per hour for merchant products. The range of products from the mill will be rods, rounds, flats, angles, channels, and light beams of various sizes.

Unlike many merchant mills which have been designed as additions to, or modifications of, existing facilities, the Atlantic Steel Company's mill will be completely new from foundations through buildings and equipment.

The 21-stand mill will be located on a four-acre site adjacent to Atlantic's present plant in north central Atlanta, Georgia.

In announcing the plans for Atlantic Steel Company's modernization and improvement program, J. H. Girdler, vice-president in charge of operations, stated that the new mill will substantially increase the company's capacity, product range and sales potential.

Mount Hope Machinery Opens Service Branch in Charlotte

A new and modern repair and service branch of the MOUNT HOPE MACHINERY COMPANY has just been opened in CHARLOTTE, NORTH CAROLINA, according to J. Douglas Robertson, president of the firm.

The new plant, which is located at 208 W. Griffith Street is fully equipped to service Mount Hope Free Wheeling Expanders and Guiders and to perform factory repair service on all of the many types of Mount Hope machinery for textile, paper, and sheet plastic manufacturing firms located in the southeast.

The Alpha Molykote Corp.

Alfred Sonntag, president, has announced that the name of The Alpha Corporation was changed to THE ALPHA MOLYKOTE CORPORATION, 65 Harvard Avenue, Stamford, Conn.

This change in company name was made to reflect the primary activity of the company which is the development, manufacture and sale of industrial lubricants which have become known all over the world under the trade name "Molykote."

Books for the Plant Engineer

Turboblowers

BY A. J. STEPANOFF
PUBLISHED BY JOHN WILEY & SONS, INC.
440 Fourth Ave., New York 16, N. Y.
377 pages
Price, $8.00

This book deals with the hydrodynamic and thermodynamic aspects of the turboblower design. It emphasizes the unprecedented developments that have taken place during the last fifteen years in the field of application of turbo-machinery for the compression of gases and vapors. It outlines new methods of attack on turbomachine problems, and discusses the art of building turbocompressors in the United States and abroad. Also shown are ways by which the performance of fans may be improved with little or no increase in costs.

Pipe Friction Manual

PUBLISHED BY THE HYDRAULIC INSTITUTE
122 East 42nd St., New York 17, N. Y.
87 pages
Price, $1.75

This manual is an extension and rearrangement of the pipe friction data contained in the earlier publication, "Tentative Standards of the Hydraulic Institute—Pipe Friction."

A section of the text demonstrates the mathematical calculations used in construction of later charts supplemented by complete tables of friction loss for water in feet per 100 feet of pipe. Wrought iron, steel and cast iron pipe sizes from ⅛ in. nominal to 84 in. I.D. are covered. Numerous examples show actual mathematical solutions to pipe friction problems.

Industrial Power Systems Handbook

EDITED BY DONALD BEEMAN
PUBLISHED BY MCGRAW-HILL BOOK CO., INC.
327 W. 41st Street, N. Y. 36, N. Y.
971 pages, 515 illustrations
Price $12.50

This book offers information on the design of electric power distribution systems for industrial and commercial installations with helpful data drawn from General Electric Company experience.

Major phases of power system design are covered, with explanations of fundamentals and methods, worked-out illustrative examples, and a variety of useful reference data. Subject matter covered includes: short circuit protection, methods of voltage regulation, allowable system voltage variations, effect of design problems on flexibility and economy, and costs of various systems.

Methods are given for protection against system overvoltage due to lightning, switching surges, and restriking grounds. Economy is discussed from various angles, and the book tells how to modernize and expand existing systems. Numerous examples and case histories are given describing installations in modern industrial and commercial power systems.

Sixteen General Electric authorities are responsible for different sections of the handbook. The editor, Donald Beeman, is Manager, Industrial Power Engineering, Industrial Engineering Section, General Electric Co.

WHAT'S NEW and Where to Get It

FOR FREE INFORMATION—Circle code number on page 17 or 18

U-1 **L-P GAS IN FORK LIFT TRUCKS**—Bulletin, 16 pages—Includes reprints on these savings by conversion, lower maintenance cost, better engine performance and longer life; cost comparison of gasoline, electrically operated vehicles and L-P gas; safety analysis; installational information, etc.—THE PARKDALE COMPANY, Los Angeles, Calif.

U-2 **BOILER FEED PUMPS**—Bulletin 2-55—Describes United Double Case, Double Volute boiler feed pumps. Sectional drawings emphasize design features.—UNITED CENTRIFUGAL PUMPS, Oakland 7, Calif.

U-3 **MINIATURE INSTRUMENTS AND CONTROLS**—Bulletin, 12 pages—Describes complete line of miniature instruments and controls for pilot plants and research laboratories. Company specializes in development of custom equipment for any unusual process control.—RESEARCH CONTROLS, Box 5035, Tulsa, Okla.

U-4 **OIL-HYDRAULIC LIFTING DEVICES**—Catalog RE-202, 20 pages—Covers field of heavy duty oil-hydraulic lifting devices for industrial use. Illustrated case studies cover manufacturing, truck, rail and special loading, feeding production machines and oppressors, and special lifting applications.—ROTARY LIFT COMPANY, 1004 Kansas, Memphis, Tenn.

U-5 **STAINLESS AND ALLOY FABRICATION**—Catalog, 16 pages—Describes company's design, fabrication and erection facilities for plate and structural steel products. Covers alloy linings, towers and vessels, industrial piping, and special contract manufacturing.—THE DARBY CORPORATION, Kansas City 15, Kans.

U-6 **VALVE COMPARISON CHART**—Manual, 15 pages—Provides easily referred to chart detailing the complete Fairbanks line of bronze and iron body valves compared with valves of other leading manufacturers.—THE FAIRBANKS COMPANY, 393 LaFayette St., New York 3, N. Y.

U-7 **REVOLVING CRANE**—3-color Folder—Describes self-propelled diesel-electric revolving cranes featuring electrically powered outriggers which are set and retracted from within the operator's cab, facilitating spot-to-spot loading jobs. Unit is self-propelled through individually-powered electric wheels.—R. G. LETOURNEAU, INC., Longview, Texas.

U-8 **AIR COMPRESSOR CAPACITY**—Bulletin No. 520-A, 8 pages—Gives hook-up sketches to help users of compressed air to improve the capacity of their installations. Features cooling controls for compressor jackets, aftercoolers and intercoolers. Also describes drain traps, electric thermostats and pressure switches.—SARCO COMPANY, INC., Empire State Bldg., New York 1, N. Y.

U-9 **COOLING TOWER WOOD**—Technical Paper No. 130—Discusses how chemical and bacteriological attack can be controlled by acid treatment and wood preservatives to kill fungi.—W. H. & L. D. BETZ, Gillingham & Worth Streets, Philadelphia 24, Pa.

U-10 **CRACKING AND EMBRITTLEMENT**—Booklet, 8 pages—Outlines various water system trouble spots and factors that can produce breakage and failure in components of heaters, boilers, condensers, process equipment, and interconnecting piping. Caustic and hydrogen embrittlement are discussed.—HALL LABORATORIES, INC., 323 Fourth Ave., Pittsburgh 30, Pa.

U-11 **ELECTRIC CHAIN HOIST**—Bulletin No. 158, 12 pages—Describes electric chain hoists claimed to have low maintenance cost. Lightweight electric hoist available in capacities from ⅛ to 1 ton. Includes design features and accessories available.—CHISHOLM-MOORE HOIST DIVISION, Fremont Avenue, Tonawanda, N. Y.

U-12 **SYNTHETIC RESIN COATINGS**—Bulletin, 8 pages—Describes Vinyl, Phenolic, Saran, Polyethylene, Epon, Neoprene, Plastisol, and Silicone Coatings. Illustrations show coating applications to storage tanks in the shipping, petroleum, pickling and chemical industries. Outlines other corrosion protection services—METALWELD, INC., Scotts Lane and Abbottsford Ave., Philadelphia 29, Pa.

U-13 **WATER-COOLED STOKER**—Folder, 4 pages—Describes design features of the "AE Vibra-Grate Stoker" which requires no dust collectors, burns low-grade coal with high efficiency, and in combination with liquid or gaseous fuels.—AMERICAN ENGINEERING COMPANY, Philadelphia, Pa.

U-14 **VIBRATING CONVEYOR**—Bulletin, 4 pages—Describes the "Oscilveyor" operation and outlines the features that make it adaptable for handling bulk materials. Lists 41 products that can be successfully handled.—GIFFORD-WOOD COMPANY, Hudson, New York.

U-15 **AUTOMATIC CONTROLS**—Bulletin No. S-730, 4 pages—Describes, with illustrations, wide range of pressure, hydraulic, temperature process and combustion controls.—A. W. CASH COMPANY, Box 551, Decatur, Ill.

U-16 **AIR DRYER**—Bulletin, 4 pages—Describes the "Oriad Dryers" for drying air or gases used to actuate tools, valves, instruments, etc. Gives dewpoint and selection charts.—C. M. KEMP MANUFACTURING COMPANY, 405 East Oliver St., Baltimore 2, Md.

U-17 **INDUSTRIAL CLOTHING**—Brochure, 4 pages—Describes complete line of 100% dope dyed Dynel shirts, trousers, coveralls, and laboratory coats designed for industrial plants. Table gives action of some chemicals on Dynel.—WYNKO MANUFACTURING CORPORATION, 176 Main St., White Plains N. Y.

U-18 **CHAINLESS CONVEYORS**—Bulletin G-100, 8 pages—Overhead conveyor design eliminates need for chain, cable, and corner sprocket. Ball-and-socket assembly permits conveyor to operate in any plane without cramping or binding. Universal

Circle code number on page 17 or 18

joints on roller-skate wheels provide easy movement and flexibility of layout.—THE LANDAHL CONVEYOR COMPANY, 539 Dennison Avenue, Columbus 8, Ohio.

U-19 **COMPRESSORS, ENGINES, TURBINES**—Catalog No. 121, 26 pages—Describes extensive line of compressors, engines and turbines for petroleum, gas, processing, marine and industrial applications. Typical installations are illustrated. CLARK BROTHERS COMPANY, Olean, New York.

U-20 **FIRE DETECTION SYSTEM**—Bulletin—"Fireye World's Fastest Fire Detector"—Contains illustrations, technical data and power information about two new standard systems designed for factories, warehouses, etc. Gives information on general wiring requirements, power supply, etc.—FIREYE DIVISION, ELECTRONICS CORPORATION OF AMERICA, Cambridge 42, Mass.

U-21 **REFUSE FUEL BURNING EQUIPMENT**—Bulletin, 8 pages—Describes burning equipment for firing bark, unhogged wood, woodchips, sawdust, etc. Outlines

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important design, engineering and combustion features.—RILEY STOKER CORPORATION, Worcester, Mass.

U-22 **BULK CONVEYOR** — Bulletin No. 455, 12 pages—Describes bulk conveyers for handling coal ashes, sand, gravel, stone chips, etc. Illustrated case studies from wide range of industries.—JERVIS B. WEBB COMPANY, 8951 Alpine Ave., Detroit 4, Mich.

U-23 **CONTROL VALVES**—Catalog No. 305, 74 pages—Covers construction, standard control valves, special valves, auxiliary equipment, etc. Technical data section gives information on flow characteristics rangeability, valve sizing, pressure drop limitations, etc.—MASON-NEILAN REGULATOR COMPANY, 1190 Adams St., Boston 24, Mass.

U-24 **LIFT TRUCK OPERATION**—24 page booklet is the sixth printing of "How to Operate a Lift Truck" of interest to operators, supervisors, safety engineers, etc. The two-color cartoon technique is designed for easy reading. Covers operation, maintenance, safety and basic material handling. Can be studied by operator himself or used as a guide by instructors.—THE HYSTER COMPANY, Portland 8, Oregon.

U-25 **CENTRIFUGAL PUMPS**—Bulletin No. 243 shows how general pumping services can often best be met with the company's Type BDM centrifugal pump which is equipped with mechanical shaft seals. Available in three, four, five and six inches sizes for maximum working pressure with cold water 150 psig, these pumps incorporate bronze impellers attached to the shaft by shrink fit.—PENNSYLVANIA PUMP AND COMPRESSOR COMPANY, Easton, Pa.

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Index of Advertisers

This Advertisers' Index is published as a convenience, and not as part of the advertising contract. Every care will be taken to index correctly. No allowance will be made for errors or failure to insert

Jenkins designed for trouble-free performance . . . a

STAINLESS STEEL "Y"

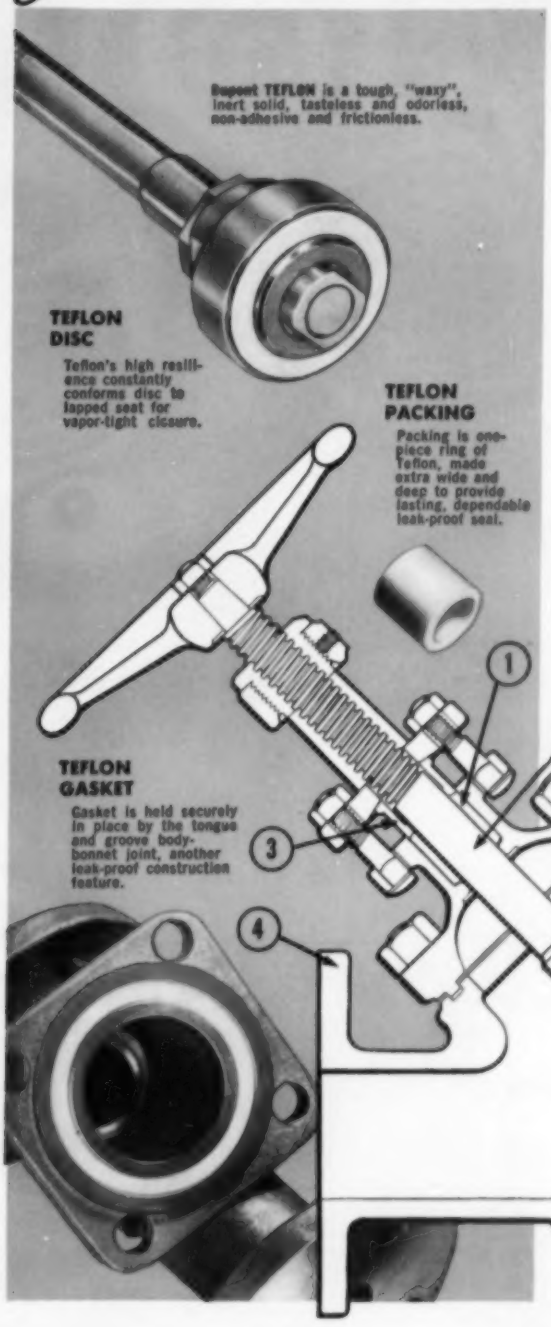
to lower costs in a wider range of

CORROSIVE SERVICES

For food and chemcial plants, and similar services, Jenkins Fig. 1335 "Y" Globe offers many advanced features that will lower operating costs and keep your processing lines trouble-free. The disc, packing, and gasket are tough, resilient Teflon. Tasteless and odorless, it eliminates problems of contamination.

The "Y" pattern permits full flow, nearly equal to that of a gate valve, and also provides the vapor-tight closure and the ease of disc renewal of a globe valve.

Fig. 1335 offers extra value by any test . . . *initial cost, operating efficiency, low maintenance.* You can convert this extra value into *extra savings* on your toughest corrosive services. Call your Jenkins Distributor, or write: Jenkins Bros., 100 Park Ave., New York 17.



FULL, FREE FLOW through Fig. 1335 is nearly equal to flow through a gate valve.

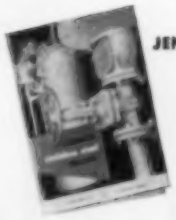
Fig. 1335 "Y" GLOBE
150 lbs. O.W.G. at 500°F
230 lbs. O.W.G. at 100°F
Sizes 1" to 4"

(1) **Packing Box**—Exceptionally deep and wide to hold optimum size packing.

(2) **Spindle**—Polished shank, long-operating threads, bevel shoulder for backseating.

(3) **Gland**—Two-piece for equalized pressure, tight seal.

(4) **Flanges**—Conform to M.S.S. Standard Practice S.P.42 Specifications.



JENKINS STAINLESS STEEL VALVE BOOKLET illustrates and describes wide range of Jenkins Globe, Gate, Check, and Y Valves, includes selection data, survey forms. Ask for Form 200-A.

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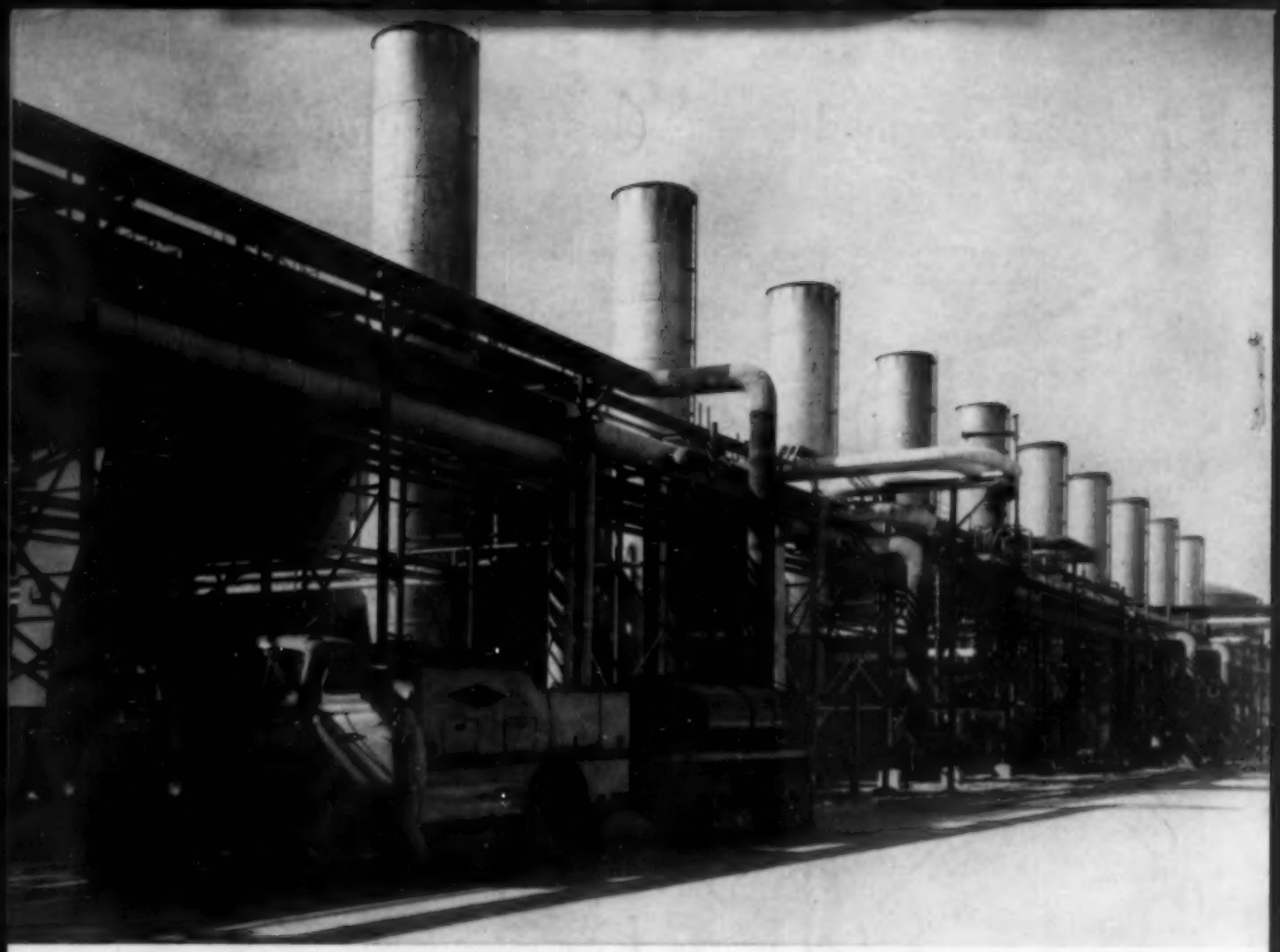

OPERATOR SAVED $440,000

DOWELL chemical cleaning of superheater avoided costly retubing and two-week boiler shutdown

Scale deposits had caused tube failures in the superheater of this 175,000-pound-per-hour boiler. To clean mechanically or replace the tubes would have required a two-week shutdown, costing $1,700 per hour in lost production. Instead, the operator chose Dowell chemical cleaning.

Experienced Dowell engineers developed special cleaning techniques for the nondrainable superheater, then used job-tailored Dowell solvents. The unit was restored to top operating condition in just 3½ days. Total saving to the operator, in cost of outage time and replacement parts, was approximately $440,000!

Dowell engineers hold downtime to a minimum by introducing solvents through regular connections. Extensive dismantling and scaffolding are not needed.

By removing corrosion products, chemical cleaning helps eliminate boiler tube failures due to overheating or galvanic attack. Prevent unscheduled shutdowns . . . keep your equipment operating at top efficiency . . . start a regular program of Dowell chemical cleaning *now*.

For more information, call any of the 165 Dowell offices in the United States and Canada. Or write directly to Dowell Incorporated, Tulsa 1, Oklahoma, Department I-26.

chemical cleaning service for industry

DOWELL

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